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ORAL HISTORY SERIES

A Link With Our Past

An Interview with

A. Edward Maumenee, MD

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ORAL HISTORY SERIES

A Link With Our Past

Portrait of A. Edward Maumenee II, MD
Painted by Wayne Ingram, 1972
On display at the Portrait Room of the Wilmer
Ophthalmology Institute at Johns Hopkins University

A. Edward Maumenee, MD

The Wilmer Ophthalmological Institute at the Johns Hopkins University and the Stanford Medical School

An Interview Conducted by
Sally Smith Hughes, PhD
1990

With Introductions by
Lewis Ort
Stephen J. Ryan, MD
Sir John Wilson

The Foundation of the American Academy of Ophthalmology, San Francisco
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1/21/98

Alfred Maumenee Jr.

Port Clear, Ala.

Dr. Alfred Edward Maumenee Jr., a world-renowned ophthalmologist and former director of the Johns Hopkins Wilmer Eye Institute, died in his sleep Sunday at his home here. He was 84.

Dr. Maumenee was considered both a pioneer in the treatment and prevention of eye disease and the foremost corneal transplant and cataract surgeon in the world, colleagues said.

In a career that spanned more than 50 years, he managed to touch every facet of ophthalmology. He made significant discoveries in the detection and treatment of retinal malfunctions, macular degeneration and several other eye diseases including glaucoma, the leading cause of blindness.

During his tenure as director of the institute from 1955 to 1979, Dr. Maumenee trained more academicians and future directors of departments of ophthalmology than anyone else in the world.

He was also instrumental in the founding, in 1968, of the National Eye Institute at the National Institutes of Health and the establishment of a nationwide system of eye banks.

In 1948, he was named professor of surgery in ophthalmology and chief of the division of ophthalmology at the Stanford University School of Medicine, a position he held until being appointed the third director of Wilmer in 1955.

Baltimore Sun

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Born, Mobile, Alabama, 1913, to parents Alfred Edward Maumenee, ophthalmologist, and Lulie Radcliff Maumenee; undergraduate, University of Alabama, 1930–1934; University of Alabama Medical School, 1934–1936; Cornell University School of Medicine, 1936–1938; internship and residency, Wilmer Ophthalmological Institute, Johns Hopkins School of Medicine, 1938–1943; early research projects; faculty member, Wilmer Ophthalmological Institute, 1943–1948; World War II research; military service, U.S. Navy, 1944–1946; chairman, Division of Ophthalmology, Stanford Medical School, 1948–1955; chairman, Wilmer Ophthalmological Institute, 1955–1979; raising funds for the Wilmer Institute; discussions on: basic scientists at Wilmer, history of surgical techniques for glaucoma, tonography, hypotony, congenital glaucoma, theories on loss of visual field, photocoagulation, the resident training program at Wilmer; contributions to research on the cornea; initiating vitreous surgery; discussions on cataract extraction, the intraocular lens, uveitis, eye donation, bleeding episodes in the eye; formation of Spectra Pharmaceutical Services, Inc.; origins of the National Institute of Neurological Diseases and Blindness; founding of the National Eye Institute; activities in ophthalmological organizations.

Introductions by Lewis Ort, Stephen J. Ryan, MD, and Sir John Wilson.

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PREFACE

Ophthalmology Oral History Series

American ophthalmology has undergone striking changes since World War II, not only in terms of basic science, diagnosis, and therapy, but also in terms of its internal organization and relationship with the rest of medicine and with the federal and state governments. Aware of the need to document these changes, the Foundation of the American Academy of Ophthalmology sought a means to preserve the memories, experiences, and insights of individuals who had lived through them.

The result was the inauguration in 1986 of the Ophthalmology Oral History Series, an ongoing series of in-depth interviews with senior ophthalmologists and others who have made significant contributions to the specialty. Aside from providing enjoyment and inspiration, the series' intent is to preserve a fund of historical information that might otherwise be lost and to give ophthalmologists a sense of their discipline's heritage.

In January 1986, an Oral Histories Committee, consisting of William H. Spencer, MD (chairman), Stanley M. Truhlsen, MD, Susan E. Cronenwett, Patricia I. Meagher, and David J. Noonan, was formed to facilitate collection of oral histories. A selection subcommittee, with an anonymous membership of three senior ophthalmologists, was appointed to select individuals to be interviewed from nominations by the Foundation Board of Trustees and the Academy Board of Directors.

In selecting individuals to be interviewed, the subcommittee considers the individual's age, prominence in and contributions to ophthalmology, and ability and motivation to participate in the project. An effort is made to select interviewees from different areas of the country and with different subspecialty interests. Colleagues in the interviewee's geographic region provide information and assist in fundraising for the oral history series, which is entirely supported by private contributions.

Production of the oral histories is a collaborative effort of the Regional Oral History Office of the University of California at Berkeley and the Ophthalmic Heritage Department of the Foundation of the American Academy of Ophthalmology. For over thirty years the Regional Oral History Office has conducted interviews with West Coast leaders in all walks of life and is pleased to have the opportunity to expand nationally to

document the history of American ophthalmology. Sally Smith Hughes, PhD, a medical historian with the Regional Oral History Office, conducts the research, interviewing, and editing, and confers with the Foundation on final production of the oral history volumes. Willa K. Baum, director of the Regional Oral History Office, serves as consultant. Licia Wells, director of the Foundation's Department of Ophthalmic Heritage, is responsible for the management and administration of the series.

An oral history memoir is a recorded and transcribed series of interviews designed to preserve the recollections, knowledge, and reactions of a person who has played or observed a significant role in important events. It represents an important way to preserve information and opinions that the narrator alone is able to provide. The transcriptions are edited, reviewed by the narrator, retyped, indexed, and bound with photographs and illustrative material, and placed in appropriate research libraries.

The finished product is both a record of a conversation and a primary research source. It should not be regarded as having the polish and finality of a published book. It is not intended to present the final, verified and complete account of events. Rather, it reflects the narrator's view, sometimes recounted with partisanship and passion, sometimes with impartiality and objectivity, but always vivid, immediate, and irreplaceable.

Oral history in one sense is an informal art, one that relies on the give-and-take between two individuals holding a directed conversation. Thus the reader should not expect a studied, impersonal, and invariably exhaustive and factual discourse in the pages that follow. Instead, the good oral history offers a close-up view of the narrator and his or her opinions, expressed with the immediacy, appeal, and occasional errors and distortions of everyday conversation.

Indexed and bound transcriptions of the interview are available to readers at the Foundation of the American Academy of Ophthalmology, The Bancroft Library at the University of California at Berkeley, the National Library of Medicine, and other medical and manuscripts libraries. The interview tapes and supplementary material relevant to each interview are on deposit at the Foundation. Oral history volumes may be ordered from the Foundation.

Sally Smith Hughes, PhD
Senior Interviewer-Editor
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University of California, Berkeley

Stanley M. Truhlsen, MD
Oral Histories Committee
The Foundation of the
American Academy of
Ophthalmology

June 1992

INTRODUCTION

Lewis J. Ort, Founder and Owner of Ort's, Inc.

Occasionally, in this topsy-turvy world we live in, we encounter the unusual person. It would seem that the Almighty who has created us all, pauses in the creation of a particular individual, and at that moment creates an extraordinary human being. Dr. Ed Maumenee is certainly that kind of man!

There have been many great persons in the medical field for over a hundred years. We salute these individuals who sacrificed so much study, time, and moments of heartbreaking research to achieve their healing goal. To have the talent for teaching the world about the miracle of healing and, at the same time, have a personality that reflects nothing but love for the individual is truly a gift to the human race.

Ed is naturally held in deep respect and, at the same time, his deep and resonant laughter is inspiring. My four daughters and I were being hailed as the givers of the first chair to the Wilmer Institute in Baltimore. There in the amphitheater Ed took his place in order to praise the family and tell of some of the conquests we had made in the baking field. He was extolling the fact that I had created the first dietary loaf of bread in three thousand years of bread making. His sentence was, "Lew made wonderful strides in the creation of a loaf of bread that was sharply reduced in calories and contained much wood!" There was a hush over the crowd and then a pealing laughter. Ed, puzzled, wanted to know what had provoked the laughter. When I called from the row the family occupied, "Ed, stick to medicine and stay out of the baking business," his resonant laughter boomed out.

Any opportunity for a moment with this wonderful person, whose skillful hands make miracles and whose sympathetic heart reflects so much love through his eyes, is an honor. Many physicians remain very deep in medicine, but when my heart was broken with the early loss of my wife, Ed saw to it that I was an invited guest at their home during the holidays. He has that rare caring for his fellow human beings which, combined with his unparalleled skills for healing, has truly earned him the term of "great." It is hard to describe how he re-establishes the feeling of confidence in those who are afraid of losing God's greatest gift of sight. The depth of feeling for him was demonstrated a few years ago when all the world of eye care came

to Baltimore to pay him tribute and celebrate his knowledge, but moreover, to be eternally grateful to him.

Recently, at a hospital I am building in Santo Domingo for the treatment of burns, I came in contact with a doctor who had studied under Dr. Maumenee. Proudly, I told him that Ed Maumenee and I are close personal friends. This older doctor straightened up and looked me in the eye and told me in Spanish, "Please sir, you do not address him as Ed, but as Dr. Maumenee wherever he is in the world."

I am happy to introduce him not only as the "great man," but equally important—my dear friend!

March 24, 1992

INTRODUCTION

Stephen J. Ryan, MD

Wilmer Institute residents at Johns Hopkins Medical School who had the privilege of training under A. Edward Maumenee held "The Prof" in the very highest regard. He was our inspirational leader. Although all the faculty, fellows, residents, and students at Hopkins profited from his talents and guidance, we did not, as residents, fully appreciate his profound influence upon ophthalmology on both the national and international levels. Dr. Maumenee is a living example of the statement that "great men are like mountains in that they are even more impressive from a distance." As we acquired (with time and age) a national and international perspective of ophthalmology, it has become clear that The Prof truly became the world leader of ophthalmology for his generation of ophthalmologists.

As a first-year Hopkins medical student, I entertained thoughts of being a cardiac or neurosurgeon. However, once The Prof made a summer research job available to me at Wilmer, my future course in following my ultimate role model, Ed Maumenee, had begun. On a very personal basis, he is the reason I look forward to going to work every day in academic ophthalmology.

On a professional basis, most ophthalmologists are aware that Ed has been president or chairman of virtually every ophthalmological organization in the United States, including the American Academy of Ophthalmology. He has been instrumental in the creation or improvement of many now-flourishing organizations, such as the Association of University Professors of Ophthalmology, the Association for Research in Vision and Ophthalmology, and the National Eye Institute. However, my intent in this introduction is not to recite Ed's tremendous accomplishments and contributions to ophthalmology and other organizations; rather, I will focus upon the personal side of this extraordinary individual and great human being.

Ed Maumenee is a great tennis player and the absolute, ultimate competitor, which accounts for his many tennis trophies, including the American Ophthalmological Society championships. My own introduction to tennis came as a Wilmer resident when Ed assigned his administrator, Gene Wilson, a good player, to teach us residents some aspects of tennis on

Saturday mornings. Since I had never previously even stepped onto a tennis court, I did not fully realize how much fun this sport would be or the extent of Ed's interest in cultivating such extracurricular activities in his residents. He is a shrewd tennis player. I cannot tell you how many times I found myself an opponent of Ed's and *not* invited to be his partner! Ed always understood the essential strategy of winning tennis doubles by picking a good partner and, thus, I would find some of my fellow residents (and better tennis players) on the opposite side of the net. He was always a tireless competitor, regardless of age, time of day, or jet lag. For example, Ed once flew into Los Angeles for a Doheny Institute meeting, making a stopover while on his way to Moscow. This is obviously not the most direct route to Russia, but was a way to help out his ex-residents here in Los Angeles. Dan Jones was also a visitor for this Doheny meeting. Ron Smith, Dan, Ed, and I played tennis as rotating partners, but after four sets, three of us were ready to retire. Naturally, Ed was the only one who wanted to continue playing. Later that evening, he still had more energy around midnight than Dan, Ron, and I put together.

As first-year Wilmer residents on rounds, we were constantly stimulated to challenge The Prof. This active give-and-take was a real highlight of my training and one which promoted enthusiasm and intellectual excitement. The faculty at the Wilmer Institute in the late 1960s and early 1970s consisted of Ed Maumenee and the Wilmer residents with three other full-time faculty members. The Prof's rounds on Thursdays and the Monday morning conferences were the highlights of the academic week. Throughout my residency, Ed's strong personal encouragement was apparent to me, and it was available to every Wilmer resident. As chief resident, my own personal, sometimes unbridled, enthusiasm would create "challenges" for the Wilmer staff, and even at times for The Prof. Fortunately for me, Ed channeled my energies into academic ophthalmology in a variety of ways.

On one occasion, the opportunity to drive with The Prof from Baltimore to Walkersville, Maryland, for Ron Smith's epidemiologic study of the presumed ocular histoplasmosis syndrome gave me the opportunity for a personal, in-the-car visit, complete with counseling and guidance. Likewise, on the trips to Walter Reed and the U.S. Naval Hospital in Bethesda, the opportunity to visit with The Prof was a real highlight for all residents and again emphasized the role-model method of teaching. He had a unique way of inspiring young residents and could discuss any and all aspects of life as a mentor, a colleague, and a true friend who cared about the welfare and career of each of his residents. Those years as residents became very special ones for all of us, establishing friendships and values that we cherish to this day.

Ed still occasionally recalls his own days as a resident with Dr. Alan Woods as professor and Dr. Jack Guyton as a good friend. Their extracurricular exploits created some of the fabric of Wilmer legend. Ed clearly enjoyed his residency at Wilmer and knew that Dr. Woods would

look out for his residents. In like fashion, The Prof looked out for all of us who had the privilege of training with him.

As a new junior faculty member at Wilmer, it was my particular pleasure to have my office, and therefore my practice, across the hall from The Prof. Ed freely shared his patients and constantly contributed to my learning experience by calling me in to see his interesting and challenging cases. His ability to make original observations continues to amaze me. I well recall his initial observations in relation to birdshot choroidopathy and his calling me in to see a collection of patients with this particular constellation of findings and then allowing me to co-author the paper with him.

Ed has always been an effective advocate for ophthalmology and used his contacts in a constructive manner, benefiting all ophthalmologists. For example, his relations with congressional leaders, such as Senator Lister Hill, in conjunction with his coordination with Jules Stein and Research to Prevent Blindness, were the key to the founding of the National Eye Institute (NEI) at the National Institutes of Health. His persuasive powers, his organizational abilities, and his own enthusiasm were critical to the success of the NEI initiative, which continues to benefit all of us in the national vision research effort. NEI-sponsored laboratory and clinical research has had a profound effect on the care of patients we all serve.

Travels, especially international jaunts, always occasioned great fun in being with Ed Maumenee, who was always at the center of both professional and social activities. In a recent Congress in Curitiba, Brazil, Ed was the last one to leave the dance floor each evening and the only American who seemed to keep up with the hospitality of our charming Brazilian hosts. As president at the most recent International Council meeting in Singapore, Ed was gracious in dealing with government leaders and the president of the country, as well as with leading colleagues from international ophthalmology. In the evenings, he took advantage of the very active Chinese social life. Into his seventies, Ed pursues such vigorous activities as chopping down trees and building new houses. He remains full of energy, enthusiasm, and commitment.

Ed is truly the professor's professor in academic ophthalmology. He has trained more chairmen of more ophthalmology departments than anyone else. The Prof is the reason that many of us from Wilmer have pursued academic ophthalmology today and the reason that I and many others find such great satisfaction in our professional careers. The enthusiasm I experience every day in my work is a direct result of the effects of his inspiration.

It is my belief that this same opportunity was available to every Wilmer resident. Ed Maumenee's involvement explains, in significant part, the remarkable track record of the Wilmer Institute in inspiring its graduates to pursue careers in academic ophthalmology and to be excellent clinical ophthalmologists in practice. He has always had the highest standards for

himself and expected the same in others, as he delivered the very best care for his patients and nurtured each of his residents. We try to follow his example and, in turn, to pass along his spirit of inspiration to the next generation of ophthalmologists and his highest standard of care to our own patients.

June 18, 1992

INTRODUCTION

Sir John Wilson

Ed has been, and is, such a central figure in international ophthalmology that his influence is imprinted on almost every positive development in that field over the past twenty years. He has a unique combination of talents. He is one of the world's great ophthalmic clinicians and teachers, shrewd of judgement, politically aware, and with a capacity for friendship and for giving encouragement to others that has enabled him to be an influential and well-loved leader in so many movements. I have had the privilege of working with him in the formation of the International Agency for the Prevention of Blindness and also in connection with the World Health Organisation's Global Programme for the Prevention of Blindness and its development of projects and organisations in so many countries.

More recently, having just been appointed a member of the International Council of Ophthalmology, I have, from the inside, seen the impact of his remarkable leadership in that organisation and in the Federation of Ophthalmic Societies.

I am sure that in this oral history you are getting many tributes to those aspects of his work, so perhaps I could add a few personal notes and anecdotes of a less formal kind.

When Dr. Maumenee retired from the Wilmer Institute, he invited me to Baltimore to take part in a commemorative seminar at which I gave an anecdotal speech recalling many of the journeys and occasions in which we had both taken part. Here are some of the quotations from the notes I retained:

> The last time my wife, Jean, and I were at a public occasion—we were the public and Ed was the occasion—was a few weeks ago in Westminster Abbey in London. The spring sunshine, which we get occasionally in London, was warming the great east window. The trumpeters were poised heraldically like candelabra, going through that extraordinary inflation routine before sounding the royal salute.
>
> Down the central aisle there came a great procession of scientists and academicians wearing the plumage and academic regalia of

> universities across the world. And appropriately, towards the head of that procession, representing the ophthalmologists of America and the world, walked Dr. Maumenee.
>
> As the great procession passed down the central aisle of the cathedral, with the fragrance of incense and mothballs, I asked Jean what was the colour of the Johns Hopkins gown which Ed was wearing so proudly. She said, "I didn't notice. I only saw his smile."

One of Ed's attributes, which he possesses to a rare degree, is that, in the pomp and protocol of a great occasion, he retains his casualness and an extraordinary outreach of warm human contact.

I remember an occasion, it must have been in the mid-'70s, when, at one of the meetings of the WHO Advisory Group, we were together in West Africa at a place with the improbable name of Ouagadougou in the Upper Volta. It was a depressing place, a grubby hotel with oven temperature and zero humidity. Ed was the most cheerful person over breakfast, though he confessed that this was not the sort of place he would recommend for a holiday. His only complaint was that his hotel room had a shower but no shower curtain and no water outlet and that he had watched, with apprehension, as the water rose in the contraption and flowed over into the room and through the ceiling. He had wondered, mildly, whether Jean and I were in the room beneath.

Whilst at that meeting in the Upper Volta, Jean and I went with Ed to some of the "river blindness" villages. In one of them there were some twenty children on their way to blindness, and I remember the sensitivity and delicacy with which Ed examined their eyes though, at that time, there was little any of us could do about it. Those villages at that time were silent, depressing places at the bottom of every development cycle, but I remember Ed saying, as we walked through one of them, "I wish Rene [Irene Maumenee] and the kids could be here to see this village and know how lucky we all are."

An incident that is perhaps not generally remembered is that Ed played a very large part in getting the World Bank involved in the West African campaign for the control of onchocerciasis. On behalf of the International Agency for the Prevention of Blindness, or perhaps it was its predecessor, the International Association of the Prevention of Blindness, he attended a World Health meeting in New York and talked about the onchocerciasis problem, which at that time was little understood. I have been involved in it for some time because the Royal Commonwealth Society for the Blind, of which I was director, had done some essential research in that region, and I had sent the details of this to Ed, who presented them brilliantly at the meeting and later went on to persuade the World Bank that they should fund the programme. At the time, this was a courageous act, because many ophthalmologists thought the whole project was a dubious

investment and there was much controversy about means of controlling the disease.

I recall also an earlier meeting in Jerusalem; it must have been in the late '60s. It was at that meeting that we first conceived the possibility of a global strategy for the prevention of blindness. I remember a long night in the King David Hotel in Jerusalem, where, over a duty-free bottle of Scotch, Ed and I worked on the document which declared that, if we could mobilise the resources and political will and multidisciplinary vision, there certainly now existed a technology, capable by the end of the century, of controlling some of the major causes of blindness throughout the developing world. In the intervening years, in many WHO meetings which Ed dominated intellectually and, in the best sense, politically, that inspiration has come to reality. Subsequently, Ed has often referred to that inspiring bottle of Scotch.

On the final day of that visit to Jerusalem, Ed and I shared a taxi to the airport. Whether it was the inspiration of the conference, or the incomparable freshness of an Israeli dawn, I quoted to Ed from the Song of Solomon, "The time of the singing of birds has come, and the voice of the turtle[dove] is heard in our land." Ed, who evidently hadn't read the Song of Solomon recently, said, "Yes, we have exactly the same sort of environmental problem in Mobile, but there it's buzzards." He sang to me a song which began, "Buzzards they fly high in Mobile," and it went on to say how these buzzards had unpredictable habits but a very sure aim. On a number of occasions since then, he has said to me, as we waded through interminable meetings, "You know, those buzzards can't win."

At another meeting in Baghdad, where we formulated the four priorities of the Global Programme for the Prevention of Blindness, Ed and Jean and I went out to a village near Babylon, which is reputed to have been the site of one of the world's first medical training centres some two thousand years ago. We found, attached to one of the buildings, a plaque which described the work of an ancient eye specialist. It said that if the specialist did an operation on a nobleman and restored his sight, he would be rewarded by forty pieces of silver. If, however, the operation destroyed the sight, the surgeon would have his right hand cut off. I remember Ed saying that this was a splendid way to retain standards and motivation amongst the ophthalmic professions.

Ed is a splendidly experienced chairman. When taking a meeting, particularly an international one with different languages, it's often difficult to get someone to initiate a proposal. After a due amount of silence, Ed would say, "Do I hear someone making this proposal?" And it would only take a cough, a squeak of a chair, or a tick of the clock to carry forward the business.

I have, over the years, met so many ophthalmologists who were Ed's students. They praise the outstanding quality of his research, but even more, his power as a teacher. He has an extraordinary ability to explain

difficult and sophisticated procedures in simple, non-technical language. I noted this especially at a meeting in Singapore in March of this year, 1990, when he described to a highly specialized audience a simple change in the standard procedure of lens implant which would make unnecessary the subsequent laser treatment that would often be impossible in a developing country except at a major hospital.

Perhaps I may end these notes as I ended the lecture I gave on the occasion of his retirement at Wilmer. It went something like this:

> It is difficult to add any tribute to one whose honour is in every tradition of this great hospital. I could praise Ed's skill as a surgeon, but that is far better done by his peers. I could praise his gift as a teacher, but that is for you, his students. But I can praise his art as a spokesman and an advocate for all of us. And beyond that, something almost inexpressible: a sensitive, searching sympathy, an outflowing cordiality, at times a very private reticence, a humour that can puncture pomposity but always with a healing touch. A generosity of spirit, a caring grace and, above all, a God-given gift of encouragement.

After that occasion in Wilmer, I sent back to Ed a small and not very competent verse that I made up on the aircraft back to England. I think it went like this:

> To some are given sure skill of hand,
> To some the charm of art.
> But the rarest gift at God's command
> Is the grace of a human heart.

June 27, 1990

INTERVIEW HISTORY

Sally S. Hughes, PhD

This oral history of Alfred Edward Maumenee is the eighth in the Ophthalmology Oral History Series, which consists of comprehensive interviews with individuals who have made major contributions to American ophthalmology. Dr. Maumenee is an obvious choice. For twenty-five years he was director of the Wilmer Ophthalmological Institute at Johns Hopkins University School of Medicine at a time when "Wilmer" and "Hopkins" were arguably the most prestigious ophthalmological and medical institutions in the country.

As the oral history attests, Dr. Maumenee has also made contributions in diverse areas of ophthalmological research, in the process publishing almost 350 papers. He has held office in virtually every major American ophthalmological society and continues to be a significant force in international ophthalmology. Of his many professional roles, the one in which he takes most pride is that of teacher. He has trained, he recounts in the oral history, more residents who went on to become department chairmen than any other figure in American ophthalmology.

Dr. Maumenee talked easily and at length in the soft accent of his Alabama childhood, dwelling with obvious pleasure on his upbringing as the son of a hard-working ophthalmologist father and a socially prominent mother. He tells of his desultory academic career until he reached the University of Alabama where a series of circumstances transformed him into a motivated, goal-directed student who subsequently took full advantage of the opportunities offered at Cornell University School of Medicine.

Starting a residency in ophthalmology at Wilmer in 1939 with the idea of eventually going into private practice in Alabama, he was soon captivated by academic medicine. Jonas Friedenwald, renowned for his quality of mind and research, was responsible for the young man's conversion. The nights the two spent examining pathological specimens resulted in a fund of knowledge about ocular pathology that Dr. Maumenee considers his greatest clinical asset. The association with Friedenwald may also have fired his protégé's ambition. "I had the nerve," Dr. Maumenee admits in the oral history, "to tell somebody when I was a second- or third-year resident that I wanted to be the best ophthalmologist in the world."

He was soon on his way. In 1948, five years after completing his residency, he was appointed chairman of the Division of Ophthalmology at Stanford. He was thirty-four. He set about to transform the division, which reflected the hierarchical Viennese system in which Hans Barkan, who preceded him as chairman, was trained. Dr. Maumenee emphasized basic research, encouraged residents to debate their seniors, set up an eye bank and ophthalmic pathology laboratory, and developed a large referral practice.

But Stanford, despite the transformations, was not Hopkins. In 1955 Dr. Maumenee returned to Baltimore to accept the chairmanship of the Wilmer Institute, drawn by Hopkins' strong tradition of basic medical research. He was excited by the prospect of a collaborative enterprise, he running the clinical side and Friedenwald the research. His plans were shattered by Friedenwald's death within months of Dr. Maumenee's return. Dr. Maumenee nonetheless saw to it that basic research was institutionalized at Wilmer, attracting basic scientists and eventually constructing a building dedicated exclusively to ophthalmic research. Dr. Maumenee's other achievements as chairman, as well as his committee work and offices in national and international organizations, are best told in his own words in his oral history.

Oral History Process

Three interviews were recorded at Johns Hopkins, and one in the garden of the Maumenee home in Stevenson, Maryland, between May 14 and May 18, 1990. Three additional interviews were recorded between October 14 and 16, 1991, at a hotel in Anaheim, California, where Dr. Maumenee was attending the annual meeting of the American Academy of Ophthalmology.

The tapes were transcribed, edited, and the transcripts sent to Dr. Maumenee for editing. Because of the one-year interval between the Maryland and California interviews, duplications were inevitable. These were eliminated, or the information integrated, and the corrected transcripts sent to Dr. Maumenee for final approval. The audiotapes and verbatim transcripts are on deposit at the Foundation of the American Academy of Ophthalmology.

I thank Mr. Lewis J. Ort, Dr. Stephen J. Ryan, and Sir John Wilson for their insightful introductions, and Ms. Jo Ann L. Young, Dr. Maumenee's former administrative assistant, for her help with the project. Background information for the oral history was collected through interviews with the following colleagues, friends, and relatives of Dr. Maumenee, to whom I am very grateful: Thomas Acers, MD, Jerome W. Bettman, Sr., MD, Frederick C. Blodi, MD, Benjamin F. Boyd, MD, Walter Dandy, MD, Morton F. Goldberg, MD, W. Richard Green, MD, William Grose, MD, Alfred E. Maumenee III, Irene H. Maumenee, MD, Neil R. Miller, MD, Frank W. Newell, MD, Edward W. D. Norton, MD, David Paton, MD, Arnall Patz, MD, Harry A. Quigley, MD, Arthur M. Silverstein, PhD, Ronald E. Smith, MD, David F. Weeks, and Frank C. Winter, MD.

Marvin L. Sears, MD, and Sir John Wilson provided information by correspondence.

Dr. Maumenee from one perspective seems the essence of the stereotypical surgeon—supremely self-confident, assertive, dominant, ambitious, a man of action and the quick fix. But there is another side: the teacher who takes almost paternal pride in the achievements of his residents, holding a favored few as dear as sons; the leader who inspired and encouraged and assisted others to perform their best by his bounding optimism and faith in their abilities; the physician who took the time and effort to explain fully to his patients their diagnosis and treatment. There is also an unexpected vulnerability, revealed particularly in the recent Spectra incident, when Dr. Maumenee was stung and mystified by the criticism of some of his colleagues. It has not all been easy. Yet the buoyant optimism remains. The multifarious contributions remain. The enthusiasm remains.

December 1993

Regional Oral History Office
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BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name Alfred Edward MAUMENEE

Date of birth Sept. 19th 1913 Birthplace Mobile Ala

Father's full name Alfred Edward MAUMENEE

Occupation Physician (Ophthalmology) Birthplace Georgia U.S.A.

Mother's full name Lulie Marker Radcliff MAUMENEE

Occupation Housewife Birthplace Mobile, Ala

Your spouse Sue Ballard

Occupation Housewife Birthplace Selma Ala

Your children Anne Elizabeth MAUMENE NELSON, Alfred Edward MAUMENEE III, Niels Kim MAUMENEE, Nicholas Radcliff MAUMENEE

Where did you grow up? Mobile & Birmingham Ala

Present community Point Clear Ala

Education U of Ala AB, Cornell Med Sch M.D.

Occupation(s) Ophthalmology

Areas of expertise Teaching. Chrm. Stanford Univ Med Sch 1948-55 Chairman Ophth. Johns Hopkins Univ. Sch. of Med 1955-1979 Emeritus Prof 1979-1989 full time. Retired but taught till June 1992

Other interests or activities President of ABO, Sec of Ophth AMA, ARVO, AUPO, NOS., Pan Am. Ophth Assoc, Pres International & IAPB Pres International Council of Ophth - Honorary Life Pres. ICO, Chrm Am Bd of Oph

Organizations in which you are active Research clinical and lab, Medical and Surgical Ophth.

I. FAMILY BACKGROUND AND EDUCATION

Family Background

Maumenee Family Roots

[Interview 1: May 14, 1990, Wilmer Ophthalmological Institute, The Johns Hopkins University School of Medicine, Baltimore, Maryland]

Hughes: *I think we should begin with the derivation of your last name.*

Maumenee: It's a bit of a story. Many of my patients throughout the years have asked me, "Are you an American Indian? Just what are you?" My grandfather [Alfred Nicholas Maumenee] came from France, so I always thought that I was of French descent on the paternal side.

As I went along, we started an exchange residency between the Wilmer residents at [Johns] Hopkins [Medical School] and Shiraz, Iran. Ali Khodadoust had been a fellow here and a resident, and he was one of the best surgeons I ever trained. We didn't have enough surgery so we were sending our residents over there and he was sending his residents here to get scientific background. The Shah promised him $2 million to put up a new eye hospital. I had to go to the Shah's palace to sign this contract. I didn't meet with the Shah but I met with the treasurer. I walked in and he said, "You don't look like an Iranian." I said I thought my grandfather was from France. He said, "Well, Maumenee is a common name in Iran. It's also with a slight difference a very common Arabic

name. It means very holy man." I said, "How do you spell it?" He said, "Of course, we write in Farsi and you write in Roman script." So after that, as long as the Shah was alive and things were prosperous, a number of Iranians came over to Wilmer and they'd say, "I want to see the Iranian eye doctor." [laughter]

I guess what happened is that my family at one time migrated from the Middle East and went to France. I've never found the name Maumenee in any telephone directory in London, Berlin, New York, or any other large city, except two names in Paris. It turns out that in Périgueux, which is in the southern part of France, there are a lot of Maumenees. So I imagine that's where my grandfather on the paternal side came from. The Menominee tribe and the Maumee River in Indiana sound like Maumenee, so a lot of people think that's where the name came from.

Grandparents and Parents

Maumenee: My grandmother on the paternal side [née Farmer] was Scottish, but she died early and I never knew her. My grandfather moved to this country in the late 1800s or early 1900s, I don't know which. He was a little man, very nice, talked with a French accent. That's about as much as I know or can remember about him.

Hughes: *Do you know what he did?*

Maumenee: He was an optician. My father, Alfred Edward Maumenee, was an ophthalmologist and professor of ophthalmology and otolaryngology at the University of Alabama when it was in Mobile. His father didn't like to work very much so, as a young person, my father had practically no money. I don't think my grandfather graduated from college.

My father worked his way through medical school. When he got out he then went to Vienna, and since he didn't have any money, he ate nothing but eggs. He got really terrible atherosclerosis and was a very stern, very determined, and very hard-working guy.

Hughes: *Wouldn't becoming an optician have required some special schooling?*

Maumenee: Well, my father taught him, and I guess he learned on the job. This all occurred when I was two or three, or not even born. So I really don't know much about it.

On my maternal side, they're primarily English. My grandmother [Emma Radcliff] lived until she was about eighty-four, and my grandfather [Stenson Smith Radcliff] died quite young, in his thirties, from a gastric ulcer hemorrhage.

I didn't know anybody on my maternal grandmother's side except my grandmother. She had a very hard time because her husband died so early and the War [Between the States] had disrupted the South. She had four children. Uncle Herndon was the oldest, and he was in the sand and gravel business. Jim Radcliff was in the lumber business, and my Aunt Lily married the president of the Merchants National Bank.

Parents

Maumenee: My father was ten to fifteen years older than my mother [Lulie Martha Radcliff Maumenee]. He was practicing ophthalmology when they married.

Hughes: *Was he at the university at that stage?*

Maumenee: As was true in every eye department, there were no full-time professors of ophthalmology. They were all in private practice, but he was head of the eye, ear, nose, and throat department.

My father was very, very strict, and very hardworking. He worked every day—Saturday, Sunday, every day. He had a good practice in Mobile. He set a good example of hard work for us and made us "toe line." In later years he took great interest in our athletic and academic interests.

Mother was very social. Actually, Truman Capote, when he described in a book the people from various sections of the country who were the most delightful hosts and the most wanted guests, he listed Mother as the most wanted guest in the southeastern part of the country. So she kept the social side going, and my father complained about having to go out all the time. [laughs]

Mother was one of the most remarkable women I've ever known. I guess everybody thinks their mother is that. She was written up as one of the beauties of the South when she was younger, and a picture of her carrying me up the stairs was in *Vogue* or some similar magazine. We kept that picture for a long time.

In Birmingham [where the family moved in 1927], my mother was also very social. She was active in charity balls and things, and she had quite an imagination. She put on a Russian ball with wolfhounds and Russian costumes which was talked about in the town for many years. She was extremely popular.

Hughes: *I know you have a brother [James Radcliff Maumenee]. Was he close in age?*

Maumenee: He's about a year and a half younger than I and a much nicer person. We played a lot together and we got along fine. I think most older brothers complain. But we were competitive and got along well otherwise.

Hughes: *You had similar interests?*

Maumenee: Pretty much. He joined in all our activities and had lots of his own friends. He finished law school at Alabama, joining the air force in World War II. He returned to Mobile and became a leader in the town. He later became president of the Alabama Drydocks and Shipping Company and brought the company out of the red.

Growing Up in Mobile, Alabama

Hughes: *Tell me something about your growing up.*

Maumenee: I don't remember too many things about my life before we started school.

In our early years we lived in Mobile. It was a relatively small town at that time, probably fifty thousand people at the most. The Alabama River empties into Mobile Bay, and Mobile Bay is about thirty-five or forty miles long and about twelve miles wide. It was an ideal place. To get across the bay, where we had a summer home, you had to take a ferry. We would load up the Model T Ford along with a cow and various things, and from the time school was out we would go across the bay and just be totally free. There were no paved roads and practically no cars. We fished all day and swam and sailed and had a great time. It was only about thirty miles away from the Gulf of Mexico. Periodically we'd go down and rent a boat with a captain and fish for tarpon and mackerel and the larger fish and have great fun. We were just totally free; we lived in our bathing suits.

Hughes: *Did your father spend time there also?*

Maumenee: He would come over on the weekends. We had a house—not too big a house. The Ladds, my uncle and Aunt Lily, were much wealthier and they had a larger house with a beautiful lawn, and my grandmother had a house. So the whole family practically moved across the bay, and my uncle and aunt and dad used to come over on the weekends. I took a friend and my brother took a friend to stay with us.

The times over the bay in Fairhope were just great because we could go camping; we'd have bonfires on the beach and would be just turned loose. We had sailboats, and we raced and sailed in the bay all the time.

I think we did some of the first scuba diving that was ever done. Sheepshead are a type of flat, striped fish with a teeny mouth, so you can't hook them because they just suck the bait off the hook. So what we invented was to fill a bucket full of air and turn it upside down and put the handle under our chin. We would dive down along the pilings and breathe the air out of the bucket and watch for the sheepshead to come for the bait. We'd give the line a jerk and catch them.

Hughes: *Where did you go to grammar school?*

Maumenee: I went to Wright's Military Academy. It was very strict. Mr. Wright was a great disciplinarian, and if you moved or talked during the morning session before you had prayers, you got a demerit. If you got so many demerits—I've forgotten the number—he would give you a lashing on the palm with a leather strap. You had to wear a uniform with white gloves and polished shoes, and if your clothes or shoes were dirty, you got a demerit. It was a good school; rated very highly.

When we moved from Mobile to Birmingham, I was about twelve or thirteen, and they thought I was advanced enough that I should skip a grade. It was a mistake, because the public schools in Birmingham taught a lot more English than the academy.

The Move to Birmingham, Alabama, 1927

Hughes: *Now, when and why did you move to Birmingham?*

Maumenee: I don't really know the full answer to that. One rumor was that my father got involved in politics. He wanted somebody to be mayor so he worked for him very hard, and he lost.

He always said that Mobile was a small town and wouldn't be the best place for us to develop. Birmingham was an up-and-coming manufacturing town because it had steel and iron ore and coal.

My father moved in '27, and we followed him shortly after that. I was born on September the 19th, 1913, so that would make me thirteen. Just as we moved, the Depression hit, and Dad had a very hard time getting along. We went to a public school instead of the private school in Mobile.

Hughes: *There just wasn't the money for a private school in Birmingham?*

Maumenee: We just didn't have enough to get along. We had a very nice house, and we belonged to the country club. Mother kept up her activities and was friends of most of the millionaires in Birmingham, but we didn't have any funds. As a matter of fact, I did some selling. I worked for my uncle, Frank Bromberg, who owned a jewelry store. I also tried to sell inexpensive insurance house-to-house, and I did not do well. So I caddied at the Birmingham Country Club. I was the only white caddy. It was a little embarrassing when my fraternity brothers played golf and I'd have to carry their bags around. But in another way it was a great advantage because the assistant pro played nine holes of golf with me many, many mornings, before school. So by the time I was fifteen or sixteen I was fairly good at golf because I'd had good lessons playing with him.

Hughes: *How were you doing in high school?*

Maumenee: I didn't do very well. I didn't study. Mother had a half-sister [Mary] who came over to spend a few days with us and decided to stay. She got married in our house and lived with us. We had a large enough house that could accommodate two families. She would help me study, and mother would help my brother study, but neither one of us would really concentrate, so my grades were not the best. I don't think I ever failed anything but Latin. I failed Cicero three or four times. [laughter] But my other grades were only fair, and I was almost pathologically shy.

Hughes: *Even with a very social mother.*

Maumenee: Well, she pushed me to be socially active, but I just really didn't have the fighting spirit, and I was very shy.

I was in the gym class at Philips High School and did quite well. I climbed ropes hand over hand up to the ceiling without using my legs and did pushups and things. Mr. Sellers Stough, who was the principal and taught one of the classes, took a great interest in me and became a good friend of my father. He helped me tremendously to get started academically.

One day, when I was a junior, they had a mile run. I'd never run a mile race before, and I beat everybody so badly they put me on the track team. I won the state championship and broke the state record of 4:48 for the mile. It just turned my whole personality around. When I found out that I could accomplish something and do better than other people, I changed my attitude about things. I studied harder. I did much better my junior and senior years because I began to study.

Undergraduate, University of Alabama, 1930–1934

Maumenee: When I graduated from high school, I went to the University of Alabama. Nineteen-thirty was still the Depression, and Dad's practice was still very slow. About 1932 or '33 it picked up very much and he was doing fine, but then, unfortunately, he had a mild coronary. So about '36, I guess it was, he had to slow down some.

I joined the Deke fraternity because my cousins from Mobile had all been Dekes. Bo Oliver, a good friend of mine, also joined. That was the most social fraternity on the campus. During Prohibition they kept kegs of whiskey hidden in the basement. Bo and I built a room in the attic where we'd be quiet and study. So I really studied hard and worked hard and ran on the track team. I began to make good grades. It was just really fun to be able to concentrate. I'd never concentrated before in my life. I got to where I could concentrate enough so that if I went to a party I could remember everybody's face and name, just after being introduced. I was a little bit dyslexic. I read slowly and would have to read very carefully, but I could remember what I read and practically recite it back. I did not make Phi Beta Kappa. I later was selected an honorary Phi Beta Kappa here at Hopkins.

Hughes: *Based on the years at the University of Alabama?*

Maumenee: No, based on my accomplishments in ophthalmology. I got honorary Phi Beta Kappa and honorary AOA [Alpha Omega

Alpha], which is the same as Phi Beta Kappa in medical school.

Hughes: *Were you headed towards medicine at this point?*

Maumenee: No, not particularly. I just was taking a regular course.

Hughes: *With no idea of what you eventually wanted to become?*

Maumenee: Not particularly. But I studied very hard. I didn't drink, I didn't smoke, and I didn't date. I just worked. When I wasn't studying, I was running. I made the track team my first year and for two additional years. In my junior year, I ran a 4:20 mile and won the Southeastern Athletic Track Conference. Since I had made the team in a major sport and won a major meet, I was made a member of the A Club and got an A for my sweater.

I became more social then because the sorority girls loved to go out with an A Club man because we'd have special dances for A Club members only. I met a young lady, Elizabeth Steel, and we became very close. That was in my junior and senior year.

It was a great experience to be doing well in school and also being an athlete, because most of the athletes didn't care too much about academia; the faculty would pass them to keep them on the team. So in my junior year I was taken into ODK [Omega Delta Kappa], which is an honor society based on all-round scholastic, moral, and athletic ability. I was elected president of ODK for my junior and senior years, and then I was taken into the Jasons, which was another honorary society. I was elected president of the senior class. Because of these activities the university elected me for the Rhodes Scholarship. I went to the final selection in New Orleans but was not chosen.

Shipping Out, 1933

Maumenee: At the end of my junior year in college, the economic situation still wasn't in full swing. That was in '33. You could get a job out of Mobile on a freighter as a work-away, and you would be paid a dollar a month and all you could eat of the food that was picked up in Hamburg on the previous trip and not refrigerated. You got one orange a week to keep you from getting scurvy. You had to go over the side of the boat and chip the paint, holystone down the teak decks, climb up in the rigging and fix things.

So I asked Aunt Lily if she could get me a job on a freighter and she did. The ship was named the Copa-Copa. As soon as I found out about it, she arranged to get me a passport, and I left home while my mother was playing bridge and my father was at work, without telling them where I was going. I hitchhiked down to Mobile to get to the boat.

It was a real experience because the seamen hated us work-aways, because we were taking their jobs away from them, and gave us the toughest jobs. Fortunately, I got put on deck. There were about six of us work-aways on the boat. They put three or four of us in the engine room, where it was hot and you couldn't see anything. On deck I had to steer the ship, and one of the real difficult things was steering it around the end of Florida because of the cross-currents. The gulf and the ocean met there and they would throw the boat in all directions. The captain was screaming at me for not keeping the boat in a straight line.

The first day I went on, I just about died. The temperature in Mobile must have been 100, 105, and we had to go into the front hold of the boat where they had sawdust. They were packing food there, and the sawdust was supposed to keep it fairly cool. The temperature was so hot, it just was impossible. The food was so terrible, you couldn't imagine how bad it was.

Hughes: *Did you lose weight?*

Maumenee: Yes. I was 135 pounds.

Hughes: *And how tall?*

Maumenee: Six feet one. But I was quite strong; I chinned myself five times with my left arm only.

I thought I was smart; I picked out a bunk right next to the engine room thinking it would be warm crossing the North Atlantic. But it turned out to be a mistake because that's where all the bedbugs like to stay, too. [laughter] I was so eaten by the bedbugs, I poured gasoline down the pipes that held the bunks up. Finally I took my mattress and put it up on deck, and I slept on deck all the way across the Atlantic.

We had a very interesting time. We stopped at the East Indian docks in London. They said, "Don't come back here at night by yourself or you'll be murdered. Always come back two or three together, and you'll probably be safe." It was really a tough place. But I got to see London, because the

work-aways were allowed to go off the ship when we went to port, and the seamen had to unload and load the ships. There were no seamen's unions at that time; that's how they could get by with it. So we visited all over London, which was exciting, and then we went to Bremen and Rotterdam and Hamburg.

Everybody along the street in Hamburg had to say, "Heil Hitler!" We knew that there was going to be a war. They told us, "When you go down to the bars, if you say one word against Hitler they'll throw you in jail, and there's no way the U.S. consul can get you out." Our ship was carrying rosin and guncotton to make gunpowder in preparation for World War II. Everybody down on the waterfront knew that there was going to be a war, but Chamberlain and the French seemed to ignore it.

I went to the medical school in Hamburg, and the director took me out in the yard. He said, "I have to take you out here because I can't tell who's listening and who might report me. We've got a politician who's just an absolute maniac—Hitler—but I think we'll get rid of him soon and get back to normal. But it's really terrible now; we're under absolute, strict control; we have to say 'Heil Hitler' instead of 'hello' every time we go down the street."

I got back late to school that year. But it was a very, very broadening experience for a boy who'd never been outside of Alabama.

University of Alabama Medical School, 1934–1936

Hughes: *What decided you on medicine?*

Maumenee: Well, in my junior year, my father gave me a microscope. I began to look down the microscope at all sorts of things. I had applied for both law school and medical school, and I was accepted in both. At the last minute I decided to go to medical school, probably because of the microscope.

Hughes: *Do you think that your father's career had anything to do with your decision?*

Maumenee: I'm sure it did. He was very anxious for me to take over his practice. I figured I was better at science than I was at arguing. Law was just arguing and didn't have any inventive aspects to it. I was always interested in doing something different.

Hughes: *Did you consider going anywhere other than the University of Alabama for medical school?*

Maumenee: Money was tight. I don't believe they charged tuition at that time. I got out of the fraternity so I would not be distracted so much and boarded in a house.

I did fairly well in medical school. I applied to Harvard and was put on the wait list. That was my first choice. I also applied to Pennsylvania, Cornell, and Tulane, and I was accepted by all three. Alabama was only a two-year school and located in Tuscaloosa at that time. It's since become a four-year school and moved to Birmingham.

Hughes: *Were there any teachers at Alabama of whom you have particular memories?*

Maumenee: Dr. Emmett Carmichael was very interested in the honorary society for medical students. He was a chemist, and I got along quite well with him. Then there was Dr. DuBoise, an anatomy professor who was brilliant.

Cornell University School of Medicine, 1936–1938

Hughes: *You had two final years of medical school at Cornell. What is there to say about that period?*

Maumenee: Well, I went up to New York on the day coach, which took about two and a half days. The seats were made out of bamboo, so it was kind of uncomfortable. It was a coal-burning train and so it was dirty. As I mentioned, my mother had been active in all kinds of social things. Elise Yorky, the wife of Tom Yorky who owned the Boston Red Sox, was from Alabama. Mother had previously been her sponsor and took her up to Atlantic City to the beauty contest, which she won. When I arrived in New York after two days of no water to bathe, Elise Yorky and a good friend of my mother's who was very wealthy, Mrs. Gage Bush, met me at the train. From there we went to the 21 Club, which was *the club*, and I was this dirty, grimy hick from Alabama. [laughs] I'll never forget; we went to see the Rockettes right after that.

I got an apartment with some friends whom I'd known quite well in Birmingham. It was on the seventh floor across from the Rockefeller Institute. I had a big steamer trunk, and I took the taxi out to the apartment house and tried to get the taxicab driver to help me carry up the trunk. New York taxicab drivers didn't go for that. [laughs]

Cornell was a great experience. I never went home while in school because I didn't have the money.

Extern at Various New York Medical Institutions

Maumenee: The senior year at Cornell was divided into four periods. One was elective, and then you had classes during the other quarters. But you didn't have to go to class unless you wanted to. You could substitute as an extern.

During the summer between my junior and senior year, I substituted on obstetrics and gynecology, and I delivered a hundred babies. The worst experience that summer was in the Berwin Clinic in Harlem. The house officers would drink beer at night and see if they could stack the beer cans all the way to the ceiling. The students had to go to homes and deliver the babies. We were told, "Carry a dollar pocket watch with you, your black delivery bag, and just enough for subway fare. If anybody holds you up, just give it to them. Don't argue." But it was relatively safe. No one bothered me at all.

You'd go into a room and the whole family would be sleeping there. Someone would have to take them outside while the baby was being born. One night I went out to deliver a forty-year-old primi[gravida]. That's always a very difficult thing. She should have been admitted to the university, where they had better facilities. But the resident didn't do it.

I got there and I couldn't get the baby to come out; so I called the assistant resident. He finally arrived, and he said, "You catch the head and I'll get up top and push and see if we can get him out." All of a sudden I heard something crack, and I thought, "Oh, my God, I've broken the baby's neck." It was the collarbone that was broken, getting him out. So we got it fixed, and they said, "That's nothing unusual. It happens with forceps in even the best of hospitals."

Hughes: *What were you expected to do if there were an emergency?*

Maumenee: I'd call the resident.

Hughes: *Well, it took time to get somebody over to the house.*

Maumenee: I know. Well, obstetrics is not a very fast specialty. It's a tedious one of sitting around waiting. The mother would call and say, "I think I'm just about to deliver," and you'd go sit there and wait and wait.

These patients were all screened beforehand at the clinic. Most of the women had had normal deliveries before, and the staff thought they were perfectly safe to be delivered at home.

We spent part of the time at the Berwin Clinic and part of the time in the hospital in ob/gyn. The only air-conditioned place at Cornell at that time was the delivery room, so I slept on the delivery table. They'd wake me up to deliver somebody. [laughter]

Hughes: *You'd hope there weren't too many deliveries in the night.*

Maumenee: It was a great experience, because at Hopkins, if they delivered half a dozen babies, that was a lot.

During my senior year, I substituted on surgery at Bellevue Hospital instead of going to lectures on surgery at Cornell. The first night I was there, a patient came in with acute appendicitis. We called the attending doctor, and he said, "This is not that golden palace of Cornell. This is a real hospital. The first one who grabs the knife gets to do the cutting." So I did my first appendectomy. [laughs] After that I did a number of amputations and other things in surgery and had a great experience with it.

I then substituted on a tuberculosis ward under Dr. [James Burns] Amberson, who was from Columbia and a leading person in tuberculosis. Somehow, he didn't think that tuberculosis was contagious, so we just wore face masks. We had so many people with tuberculosis that they had to have a barge pull up alongside Bellevue to house these people. Being in charge of the TB ward, I was the consultant on a patient who had lung disease, for the residents and the senior residents who were in general medicine. If they had a patient with a lung problem, they'd have to consult me to see what to do. And here I was, a medical student [laughs] who didn't know anything, who was in charge of all these patients.

Hughes: *What was done for tuberculosis before antibiotics?*

Maumenee: They just put patients in bed or they sent them to sanitariums. If they were bad enough, they would collapse the lung. It was more placebos than anything else.

Hughes: *Who was of note on the Cornell faculty?*

Maumenee: At Cornell, we had Tolstoy in diabetes. I substituted on the medical wards at Cornell also, and worked with him. He was

very good. We had Harold Wolff, who was a neurologist, one of the best. And Dr. Bronson Ray, a top neurosurgeon. I substituted on his service, so I got to assist in a lot of brain surgery.

Hughes: *Was this common practice for Cornell medical students?*

Maumenee: Yes.

Then I went up to the cancer clinic at Memorial Hospital, which was on 168th Street [in New York City]. It wasn't called Sloan-Kettering until later, when it moved to 68th Street and York Avenue. There I met [James] Ewing and Hayes and all of the big people in cancer. We saw more cancer than I've ever seen the rest of my life. We went to all the clinics and saw how they were treating cancer.

Hughes: *Was there a heavy emphasis on radiation therapy?*

Maumenee: Yes.

Hughes: *There was very little chemotherapy?*

Maumenee: There was no chemotherapy. It was surgery and radiation.

Hughes: *Were these experiences giving you ideas about what you wanted to specialize in?*

Maumenee: Yes, in way. I really thought about going into general surgery. On Saturday, I would go down to the rounds of Foster Kennedy and [Samuel Bernard] Wortis, who were neurologists at Bellevue. On Sunday, I went down to [Marion B.] Sulzberger, who was a great dermatologist, and we saw leprosy and all kinds of rare skin diseases.

There were three of us medical students: Gus Damon, who later became professor and chairman of the Department of Pathology at the Peter Bent Brigham Hospital in Boston and one of the most famous pathologists in the country, and Fred Hughes, who went into the army and later became surgeon general. The three of us would go up to the New York Academy of Medicine at night and listen to the talks, because we thought they were a lot better than our teachers were giving. Gus Damon was a big guy, about six four, and he only slept about two or three hours a night and worked all the rest of the time. He was the leader of the group.

Hughes: *Were you doing well?*

Maumenee: I did well. I got first prize in obstetrics. Since I had transferred, I did not make AOA at Cornell. But everything else went along fine.

My father and my brother were coming up to my graduation, and my father had a stroke while on the train and died in Greensboro, North Carolina.

He was coming up about a week before graduation to visit the clinics to see if there was anything new in eye surgery. I went home then without taking any final examinations. The only two final examinations they wanted me to take were public health and ob/gyn. Henrich Stander, who was chief of obstetrics and gynecology, called me in and quizzed me.

I found out later that Stander took time off from work and came down to Johns Hopkins and talked to Dr. Alan Woods about taking me onto the house staff at Wilmer. I applied at the New York Eye and Ear Infirmary and I also applied for general surgery, because I wasn't sure which I wanted to do, particularly after my father died.

Hughes: *You wouldn't be going back to his practice.*

Maumenee: I couldn't go back to his practice because I had to take a residency.

II. THE WILMER OPHTHALMOLOGICAL INSTITUTE, 1938–1948

Intern and Resident, 1938–1943

Maumenee: [Henrich] Stander came down and talked to Dr. Woods and obtained a residency for me at the Wilmer Institute. So I went straight from medical school into ophthalmology.

Hughes: *As an intern?*

Maumenee: We were called interns. We could do that then without taking a medical internship. I had rotated through so many specialties during my senior year, I practically had a rotating internship.

Hughes: *But the internship at the Wilmer, of course, was just ophthalmology.*

Maumenee: Straight ophthalmology. That's right.

Hughes: *In many cases, a medical student wouldn't have had that broad experience. Would it still be possible to be an intern strictly in ophthalmology?*

Maumenee: A regular internship is now required before you can take the American Board of Ophthalmology exam.

Hughes: *Did you consider your lack of a formal internship a handicap?*

Maumenee: I never did, and when I became chairman, I took many people straight from medical school. If you really want a medical

ophthalmology practice, then you should specialize in medical ophthalmology. When you're ten years out of medical school, you're so far behind in other specialties, you really aren't up to date in anything but ophthalmology. So I didn't feel that it was any great advantage to take an internship. You did all the scut work; you were in the lab doing the urinalysis and the blood work and bacteriology. In many places, you were the lowest on the totem pole when you were an intern, so you didn't really get to do very much.

I'd gotten to do more as a substitute than the interns had, so I never felt that a rotating internship was necessary. If you want to be a medical ophthalmologist, then learn something about medical diseases, like Frank Walsh did. He then wrote a book on neuro-ophthalmology and became so famous he was called the father of neuro-ophthalmology.

Hughes: *You mean learn on your own.*

Maumenee: That's right.

The Physical Setup of the Institute

Hughes: *What was the physical setup of the Wilmer Institute when you arrived?*

Maumenee: [Dr. William Holland] Wilmer had insisted on three things—teaching, basic care of patients, and research—all to be done under the same roof. That's the combination that made the Wilmer Institute great.

Hughes: *Do you think that was his idea, or had he gotten it from William H. Welch or somebody else?*

Maumenee: He probably got it from Vienna, because that's the way they ran their clinics in Vienna. But none of the clinics were run like that in the States. His was the first.

You asked me about the physical setup. There was a research area. We had two clinics side by side; they were very big rooms. All the patients would sit in the back of the room. There were five or six desks where physicians would sit and take histories. It was very embarrassing to say, "When was the last time you had gonorrhea?" [laughter]

Hughes: *To the whole room.*

Maumenee: "When did you get syphilis?" [laughter] Those words, in those days, were not said in polite company. You couldn't even ask about tuberculosis; it was a forbidden thing to mention.

Hughes: *But you did, didn't you?*

Maumenee: We did, yes.

In between those rooms, they had a place with a couple of perimeters where you could take visual fields and where you could take the tension with a couple of Schiötz tonometers. That was the way the clinic was run. The inpatient beds were on two floors. The second floor was for private patients. Here there were a few single-bed rooms, some two-beds, and two large six-bed rooms. The clinic beds were on the third floor for ward or resident patients. The wards were good, except for the fact that they had two large rooms that extended the whole length of the building. The patients were divided into four sections for white and black, and male and female. In the sections, only curtains separated the beds.

Hughes: *Was the medicine that was practiced in each of those sections—black and white, male and female—any different?*

Maumenee: No, except that each patient on the second floor had his or her own doctor, and the patients on the third floor were cared for by the residents.

Hughes: *The quality was the same?*

Maumenee: The same.

Hughes: *Segregation wasn't for a medical reason; it was for a social reason?*

Maumenee: Strictly social.

When I came I had the whole second and third floors torn down, and I tried to get the whole place put into private rooms. But Russell Nelson, the director of the hospital, said, "No, you lose beds when you do that. We can't afford to lose beds." As it turned out, we are now down to about twenty-eight beds and we don't keep those filled, because we do almost all outpatient surgery.

Research on Retinal Lesions

Hughes: *Tell me about your first interest in research.*

Maumenee: Well, the first paper I wrote was on cytoid bodies that everybody had been calling tuberculosis.* I looked at the white lesions in the retina of people who later died, particularly of lupus erythematosus and scleroderma and other collagen diseases. In the literature, they were all called tubercles. There were no tubercles there; they were just swollen fibers. I made the mistake of calling them dendritic fibers and not neurofibers. It turned out it's blockage of axoplasm in the nerve fiber that makes the fibers swell and turn white.

Hughes: *You called them cytoid bodies.*

Maumenee: Yes, that was a general name for them.

Hughes: *I looked "cytoid" up in the dictionary, and it sounded as though it was just a very general term for a structure that looks like a cell.*

Maumenee: It is a white lesion in the fundus which also occurs in people who have bacterial endocarditis. My interest in cytoid bodies strengthened my contacts with residents in medicine. They'd have a patient with a strange recurrent fever, and they wouldn't know what it was. They'd call me over as an intern to look at it. I'd look at the fundus and see the cytoid bodies and say, "Look, this is one of the collagen diseases." So it was a diagnostic method until they very soon got much better ones. But it was one of the key diagnostic methods for the so-called collagen diseases, which are scleroderma, lupus erythematosus, and dermatomyositis.

At the time of my residency, Hopkins was so small, I knew all the house officers in medicine, I knew all the house officers in surgery, and I knew the instructors and the people doing research. I went to the school of hygiene and talked to Dr. Tommy Turner about vitamins and what vitamins did systemically. I learned a lot about tissue culture from working with Dr. George Guy. Hopkins was great because these were really world-renowned professors, and I was merely a house officer. They'd pitch right in and set up a problem for me to work on and then come instruct me on how to work it.

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* Maumenee AE. Retinal lesions in lupus erythematosus. *Am J Ophthalmol* 1940; 23:971–81.

Prominent Ophthalmologists at Wilmer

Jonas S. Friedenwald

Maumenee: Friedenwald was the same way. He took great interest in what I was doing, and we became extremely good friends. I learned many things from him by working a lot with him at night in pathology. We used to have lunch together every Thursday. We would have roundtable discussions about everything in the world. He was my ideal. He was so liberal and open-minded and so great, as well as being a real genius. I admire him more than anyone I've ever known. He's the only genius I ever knew. They had a memorial service for him which was published in the *Johns Hopkins Bulletin*. Justice Felix Frankfurter was one of the speakers, and he said that Jonas understood law better than most Harvard law professors. Abel Wolman, who was the great man in sanitation, said that Jonas was one of the best epidemiologists that he'd ever known.

Hughes: *Had he picked up these fields on his own?*

Maumenee: Yes, by reading. He loved theory. He argued mathematics with Einstein. They had lots of correspondence back and forth. He helped set up the Hadassah Hospital in Israel.

His idea of a vacation was to go up to the Algonquin Hotel in New York and take two yards of books with him and sit down and read.

Hughes: *On everything, not just ophthalmology.*

Maumenee: Yes. He just had insight into everything, and he was so brilliant, it was just amazing. George Koelle, who later became professor of pharmacology at Pennsylvania, said that Jonas knew more pharmacology than any professor of pharmacology he had ever met. Dr. Wood, the chairman of the physics department at Hopkins, said he was an expert in that field.

During World War II, when Friedenwald was trying to find an antidote for mustard gas, the head of synthetic chemistry at DuPont was working with us, and Friedenwald would correct his mistakes in chemistry. He was really a wonderful guy.

Hughes: *What was he doing in research in ophthalmology when you came on the scene?*

Maumenee: He was working primarily in glaucoma. His work in glaucoma still stands as a model for all young researchers.

[Sir Stewart] Duke-Elder was the great name in ophthalmology and had written tremendous volumes on every aspect. His writing is absolutely exquisite, and his books are unbelievably magnificent. How that man could do it, I don't know. He was a real genius in writing and organization—not in ophthalmology research, because if there were the two sides of a question, Stewart frequently picked the wrong side.

Hughes: *I remember there was a long-standing argument about the formation of aqueous, and Duke-Elder turned out to be wrong.*

Maumenee: One theory concerned secretion and the other diffusion. If you put salt and water on one side of a barrier and water on the other, the salt, being hypertonic, will draw the fluid from the water side to the salt side. Since they knew that there was a very high ascorbic acid level in the aqueous, Duke-Elder thought that the aqueous was an ultrafiltrate. Jonas proved the aqueous to be secreted, not diffused.

Alan C. Woods

Maumenee: Alan Woods was a good teacher, too. He never took a residency in ophthalmology. He took an internship, and then he went into the service in World War I. When he got out, he worked for a year with [George E.] de Schweinitz in research, and then he went into practice with his father where he learned ophthalmology. It was common practice in those days to take a preceptorship with a good ophthalmologist. So he never took a formal residency in ophthalmology. The same was true of Jonas Friedenwald, Fred Verhoeff, and many other outstanding ophthalmologists of that time.

Hughes: *Was it evident that he lacked the residency?*

Maumenee: I think that he didn't have the all-around experience of a resident trained today. He was not a super surgeon or eye pathologist. He knew a lot about uveitis. He tried both clinical and laboratory studies, but the scientific technique used at that time would not be considered adequate today. Dr. Wilmer was also not a scientist; he was a very famous practitioner.

Every patient with uveitis, Alan Woods called tuberculosis. It turns out that tubercle bacilli have been found in only a few eyes with chronic uveitis.

Hughes: *Why would Woods diagnose uveitis as tuberculosis?*

Maumenee: Well, it was the fad of the day. Tuberculosis was a common, chronic granulomatous disease. He could produce a granulomatous uveitis by injecting animals with the tubercle bacilli.

Hughes: *Did he think of it as an allergic reaction, somewhat like phlyctenulosis?*

Maumenee: No, he thought that the actual tubercle bacillus got into the uveal tract and caused the problem.

Hughes: *How could he explain the fact that he couldn't see the bacillus?*

Maumenee: Because the bacillus is very hard to find, even in people with known tuberculosis. It takes a very special stain, and the bacteria seem to disappear. It wasn't unusual not to be able to find it in many cases, but at least in the red hot cases, you should have been able to find it. And they were able to find it. There were people with tuberculomas in the eye. Those were inflammatory nodules that weren't chronic uveitis. They were inflammation. In the tuberculomas they found tubercle bacilli all the time.

Hughes: *I believe Woods had two classifications for uveitis.*

Maumenee: That's right. Anterior and posterior.

Hughes: *Was that it? I thought he had one category for cases in which he had found an infectious agent and a second category for those where he couldn't find an infectious agent.*

Maumenee: Well, that is not exactly right. His classifications were nongranulomatous uveitis, which he thought was due to an allergic response to some toxin, and a granulomatous uveitis, which was a response to a living bacillus or virus.

I remember Grady Clay, who was one of the leading ophthalmologists in Atlanta, Georgia, sending a patient to Alan Woods with a note saying, "Dear Alan, I'm sending so-and-so to you for review for the cause of uveitis. I know you are going to call it tuberculosis. You call everything tuberculosis." [laughter] Sure enough, he did.

Woods inoculated animals with the tubercle bacillus and then treated them with various substances. Although he was trying his best, and at the time it wasn't too bad, he would ask Earl Burky, who was his laboratory man, "Okay, is this the animal we injected with tubercle bacillus or is this the one we didn't?" Then he would read the result. Well, that adds such a bias. I don't mean to criticize him for that, but it really sensitized me to his concepts of uveitis.

One of Alan Woods's greatest attributes was that he was very loyal. If he didn't like you, you were nothing. He just couldn't stand you. If he liked you, there wasn't enough he could do for you.

Alan Woods made rounds on patients on Mondays and Thursdays, and so did Wilmer. Wilmer had a whole entourage of nurses who carried candles so the light wouldn't hurt patients' eyes. It was a ceremony. Alan Woods was much rougher. He was very crude and rude when he wanted to be, which was a good bit of the time.

Hughes: *Even in front of patients?*

Maumenee: Yes. I can remember, he told a woman, "Your child has got retinoblastoma and he's going to die," and the woman started crying. He said, "Look, lady, if you want to cry, you can go ahead and cry all you want to. I want you to know it's costing you $50 an hour to sit there and cry in front of me, or you can stop that crying and listen." Some people just hated him, and others thought he was God. He could be so nice. He was absolutely wonderful to me. He did everything he could possibly do for me. I went down to his summer home to visit. I just really liked him. He couldn't have been nicer, except he wouldn't pay me anything.

Hughes: *[laughter] He didn't pay anybody anything.*

Maumenee: He didn't pay anybody much. That's right.

Hughes: *Would you describe him as a rough diamond?*

Maumenee: Very much so. His handwriting was totally impossible to read. You couldn't understand a word he said. I always said he did it on purpose because you had to think so hard about what he was saying, you couldn't think of an answer to combat him. [laughter] When he got the Gonin Medal, he gave his acceptance speech in French. The French people said, "What language is he talking? I wish he would talk in

English. I would understand him better." [laughter] He was a very charismatic guy that people either loved or hated.

Hughes: *Did Dr. Woods spark your interest in uveitis?*

Maumenee: Yes, to some degree. Not as much as he did in Jack Guyton. Jack was a year ahead of me in the residency program. The whole Guyton family has been written up in *Reader's Digest.** The article says they're the Huxleys of America. They've all gone through medical school at the top of the class. Jack was at the top of his class, but he was much more interested in mathematics than he was in ophthalmology.

He reviewed all of the charts of Dr. Woods's patients with uveitis. This was a herculean task which took many months. He said, "Ed, I can't believe it. Dr. Woods calls everything in the world tuberculosis, and he doesn't really have any proof." If the patient had a positive skin test for tuberculosis—and 90 percent of the people did in those days—and he didn't find anything else specifically wrong with the patient, then he thought the uveitis looked like tuberculosis; but it looked like tuberculosis because the patient had a positive skin test. So it was a circular argument.

[Helenor] Wilder Forster at the AFIP [Armed Forces Institute of Pathology] was a remarkable woman. She had a college degree and became a self-taught eye pathologist. She made marvelous discoveries, some of the best discoveries in uveitis, by just looking at the histologic specimens. She also found toxoplasmosis in the eye. Conditions that Verhoeff and Friedenwald had called tuberculosis, she found weren't tuberculosis but a toxoplasmosis in which the organism was located in the retina.

Hughes: *Why had everyone else missed these organisms?*

Maumenee: Because they hadn't really done the correct stains and carefully examined the immune reaction in the uvea which was secondary to the organism in the retina. Hellie found the free forms and encapsulated cyst of toxoplasma. She showed that toxoplasmosis was primarily an infection of the retina and that the inflammation in the choroid was only a secondary immune phenomenon. She was also the first to find nematodes in some eyes, especially of children, that had been diagnosed as tuberculosis.

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* Bode R. Arthur C. Guyton: A doctor who's dad to seven doctors so far! *Reader's Digest* 121 (December 1982), pp. 141–45.

Frederick H. Verhoeff

Maumenee: Verhoeff was another brilliant person who went straight from being a medical student at Johns Hopkins to the Massachusetts Eye and Ear Infirmary as head of pathology. He made many fundamental discoveries in clinical diagnosis and treatment of eye disease.

There is a story about Verhoeff and some famous Boston ophthalmologists visiting his laboratory. Verhoeff said, "I knew they didn't know a thing about pathology so I purposely put the microscope totally out of focus so they couldn't see anything." They looked down and said, "I agree with you; I think that's the correct diagnosis." [laughter] Verhoeff said, "I knew I had them, that they were just a total farce."

Hughes: *He was a real devil, wasn't he?*

Maumenee: Oh, he was. He was so smart. He was so capable. He was lots of fun. I always drove him back from the Ophthalmic Pathology Club, and we had great conversations. He said, "I'm not mean like everybody says I am. It's just that those people are so wrong."

Do you know the story about him and a very wealthy woman? Shortly before she died, she changed her will and left all her money to somebody outside the family. So the family contested the will in court, saying that she was senile and didn't really know what she was doing. So they brought Verhoeff in, and Verhoeff said she was very intelligent, very acute, and knew what she was doing and everything was fine. They said, "Dr. Verhoeff, you're a good ophthalmologist, aren't you?" "Yes." "Are you the best ophthalmologist in the world?" He said, "Yes, I am." "What makes you think this woman is so intelligent?" "Well, she came to me because she knew I was the best in the world." [laughter] That hit the headlines of the Boston papers.

Verhoeff's famous statement is, "The only mistake I ever made is I thought I made a mistake one time, but I was wrong." [laughter]

Early Research Projects

Hughes: *Tell me about other research projects during your internship?*

Maumenee: There was the work in pathology with Friedenwald and also the work with Lou Hellman, who later became the leading obstetrician in the country. We worked on newborn babies that had hemorrhages in the retina.

The first project was a pathology project on lupus erythematosus. I spent every night in the pathology lab trying to make whole-mount preparations of the retina and stain them, so I could see what was happening. I went to see the head of the Carnegie Institute, Dr. [George W.] Corner, and he said, "You're not the first person to do this. People have been trying to do stains and look under the microscope at whole tissues forever, and nobody's ever been able to do it, so don't think you can do it."

But I did anyway. I would take a pig or cow retina that we got from a slaughterhouse, and I'd stroke hematoxylin and eosin on the surface with a camel's hair brush, trying to get the stain into the tissues to look at them. I did that for the cytoid bodies in the retina. Then we'd section and look at them, and there were no tubercle bacilli in them. Jonas and I didn't know what the cytoid bodies were, but we guessed they were the smaller dendrites in the retina. We didn't know anything about axoplasmic flow at the time, or we might have gotten it right. Norman Ashton later showed that the cytoid bodies were blocked axoplasm in the axon due to ischemia.

My second research project was on babies with retinal hemorrhages. Lou felt that the hemorrhages might be due to lack of vitamin K. The women were taking mineral oil during their pregnancy and they didn't absorb enough vitamin K. We gave the mothers vitamin K intravenously so it wouldn't be blocked by the mineral oil. I went over every night and saw the newborn babies of that day and dilated the pupils and looked at the fundi. It was interesting from the point of view of statistics. I didn't know which mothers were getting vitamin K and which weren't getting vitamin K. It turned out that of the first fifty cases, twenty-five had gotten vitamin K and twenty-five hadn't. In those that got the vitamin K, I think there were two or three hemorrhages in the retina. In those that had not, some 80 percent had hemorrhages. I said, "We'd better do another fifty cases." The statistics came out the opposite way. So when somebody says something about small numbers and gives me all these fancy formulas, I say,

"They don't convince me one bit." I don't care how fancy the formula is, you can't tell with small numbers when you're trying to find out whether something works. You've got to have large numbers.

Anyway, we published that the use of vitamin K in the mother may have been the factor in the development of retinal hemorrhages in newborn babies, but it turned out not to be.*

Hughes: *Was this the first time that an association between retinal hemorrhage and vitamin K had been observed in the newborn?*

Maumenee: That was the first time and that was Lou's idea.

Another study I did as a resident was an attempt to isolate the virus that caused a severe conjunctivitis, called shipbuilder's conjunctivitis, which is caused by an adenovirus.** Shipbuilder's conjunctivitis was a major factor in causing a slowdown in industrial plants. Guy Hayes was an intern in medicine, and Tom Hartman was in medicine, too. We tried to isolate this virus in chick embryos, and I started a lab with chick embryos to get the virus out. Actually, what we isolated was a herpes virus, so it turned out we didn't find the adenovirus.***

Hughes: *Where had you learned virological technique?*

Maumenee: Just by reading it in a book.

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* Maumenee AE, Hellman LM, Shettles LB. Factors influencing plasma prothrombin in the newborn infant. IV. The effect of antenatal administration of vitamin K on the incidence of retinal hemorrhage in the newborn. *Bull Johns Hopkins Hosp* 1941; 68:15868.

** Maumenee AE, Hayes GS, Hartman TL. Isolation and identification of the causative agent in epidemic keratoconjunctivitis (superficial punctate keratitis) and herpetic keratoconjunctivitis. *Am J Ophthalmol* 1945; 28:823–39.

*** For a description of the isolation of the adenovirus, see *Phillips Thygeson, MD.* Ophthalmology Oral History Series, A Link with Our Past. Interview conducted by Sally Smith Hughes. The Foundation of the American Academy of Ophthalmology, San Francisco, and The Regional Oral History Office, University of California at Berkeley, 1988, pp. 95–6.

The Halsted Residency System

Hughes: *Apparently there was a system at the Wilmer Institute for assigning duties to interns and residents. The senior resident assisted Dr. Wilmer, and there was a descending hierarchy. Was a similar system operative when you were there?*

Maumenee: There was a strictly pyramidal system. The Wilmer took four house officers the first year. At the end of the first year, two were dropped. At the end of the second year, one was dropped, and the final one went on to the senior residency. He got to do all the surgery and met Dr. Wilmer at the front door. The senior resident assigned duties to the junior house staff. As a junior house officer, you assisted [in surgery] and did everything except operate. You did all the work that the nurses do now, which was time consuming. We hated it because we had to clean all the instruments. They said they were too delicate for a nurse to handle, so we had to do it. It was the so-called Halsted system. That's the way [William S.] Halsted ran surgery. So Wilmer instigated the Halsted system into the ophthalmic residency.

Hughes: *I believe you kept the old Wilmer structure for the residency, a pyramidal structure, when you became chairman.*

Maumenee: Semi-pyramidal.

Hughes: *What do you mean by semi-pyramidal?*

Maumenee: Alan Woods started the semi-pyramidal system. We kept every resident for three years. Then one or two would be kept on for five years and become senior resident and run the residency program. Halsted had the exact pyramid system in general surgery. He took about ten residents and then got rid of five the first year, three the second year, and then he kept one for five or six years.

Hughes: *That's pretty cutthroat.*

Maumenee: It was awful, because the poor residents who had been there for two years just couldn't get any further training. So Wilmer [Institute] shifted over to a basic three-year program, and either one or two we kept for two more years.

Hughes: *Was it the chairman's exclusive decision to pick the senior resident?*

Maumenee: Yes.

Hughes: *Were all the surgeons using gloves by the time you arrived as a resident?*

Maumenee: Not all. Some of the older surgeons still didn't wear gloves.

Hughes: *Dr. [Dohrmann K.] Pischel talked about that* and it didn't seem to change the results very much.*

Maumenee: No, but you have to take it in its full context. The Viennese ophthalmologists were very good and taught many of the leading ophthalmologists in the States. When they operated, they never introduced the same instrument into the eye twice, and they never used an instrument in the eye if it touched the outside of the eye. Most infection comes from the lid margins; it doesn't come from the surgeon. In the poorer countries, gloves still aren't used for ophthalmic surgery.

Hughes: *For economic reasons?*

Maumenee: Yes. In general surgery, when you put your hands inside the skin incision, you get bacterial contamination. But you don't do that in eye surgery.

Hughes: *Who else was there when you first arrived at the Wilmer?*

Maumenee: Besides those I have mentioned, Frank Walsh, Louise Sloan, and many very good people in private practice.

John McLean

Maumenee: We worked hard during our residency. John McLean was my senior resident and he was certainly one of the best senior residents we ever turned out. He was an excellent surgeon and a wonderful teacher. I remember telling him when I was interviewed for the residency, "I don't know one thing about ophthalmology. I've worked a little with [Bernard] Samuels at the New York Eye and Ear Infirmary." He said, "That's good. Then you won't have to unlearn something. You can start out fresh and learn it right."

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* See *Dohrmann Kaspar Pischel, MD.* Ophthalmology Oral History Series, A Link with Our Past. Interview conducted by Sally Smith Hughes. The Foundation of the American Academy of Ophthalmology, San Francisco, and The Regional Oral History Office, University of California at Berkeley, 1988, p. 12.

Hughes: *And he proceeded to teach you?*

Maumenee: Yes. He was very good.

John McLean was certainly the leader for the residents. All of us just had the greatest admiration for him. He stayed on after the residency for a couple of years. During the residency period, you had a year off when you could visit other universities to see what they were doing, or you could do a piece of research. But you weren't bound down with a bunch of clinical duties.

John and I roomed together on Broadway about four or five houses down [from the Wilmer Institute]. We had the top floor apartment, and we were the first people to have an automatic dishwasher. When we'd finish our meal, we'd put all of our dirty dishes in the bathtub and turn the shower on and let it run all day, and come back and clean it up. [laughter] We became very, very close friends, rooming together like that. He was an extremely bright guy, well versed in literature, and a very, very good surgeon.

Alan Woods's specialty was medical ophthalmology, as was Frank Walsh's, so John taught us surgery. Corneoscleral sutures were used by [Karl D.] Lindner, by Verhoeff, by a number of people, but John popularized them. So everybody gives John credit for starting the corneoscleral suture. In his paper, he cites the people who used them before he did, but they still give him credit because he popularized them. The use of this type of suture prevented many postoperative complications. It allowed us to get the patients out of bed the day after surgery instead of using sand bags and keeping the patient in bed for a week or more.

After two years at Wilmer, John went straight to the professorship at Cornell. They had a good department.

John was at a meeting of the New York Ophthalmological Society, when Arnold Knapp said you should not use a knife that was too sharp because you might make a mistake and cut where you shouldn't cut. Knapp always had the last word to say about everything. Any talk that was given, he was the king in New York. John got up and said, "If you can't use a knife that's too sharp, you shouldn't be an ophthalmologist." If you didn't have any more skill at surgery than that, you shouldn't be operating. So John made enemies right away. He was really a very shy person underneath, but he was very cocky on the outside. So until people got to know him in New York, he wasn't very popular. Once they got to know that he

was really sincere and he was really smart and really good, they liked him very much.

John and Jack Guyton were the two really smart people with me during the residency period. Bill Hughes was in the same year I was in, and there was a big question as to whether he or I should be the senior resident. We made an agreement that if Dr. Woods chose both of us and then gave us a chance to say who would go first, we'd flip a coin to decide. But what happened was Dr. Woods called me in and gave me the senior residency. Then he called Bill in and asked him if he wanted to wait a year to take it. I don't think Bill ever forgave me for not flipping a coin. But Dr. Woods appointed me first and Bill second, so if I'd flipped a coin, I don't know what Woods would have done. Probably kicked us both out. Bill was capable. He was an excellent artist and very smart.

Hughes: *The decision about who was to be senior resident was strictly up to the director of the institute?*

Maumenee: It was. You see, there was only one professor in any department at Hopkins and he was the chairman of the department.

Hughes: *Nowadays it would be done differently?*

Maumenee: Yes.

When I came back in '55, I was the only person on the full-time staff. Walsh had gone into private practice, Friedenwald died from cancer of the colon a few months after I got back, and Howard Naquin went into private practice.

Woods retired and said, "Let me stay and see a few patients," which had never been done before. The Hopkins rule was, once you finished your professorship you could no longer stay at Hopkins, because the former professor with his great prestige would run everything and the young guy coming in wouldn't have an opportunity to develop anything.

Hughes: *But didn't you let Woods stay?*

Maumenee: Yes, I went to the board and said, "Look, I want him to stay. He's not going to bother me. He's always been a tremendous help to me, and he would continue to be a great help to me. He can have an office." He never once interfered with anything I did. If I asked his opinion, he'd give it to me, but

never, never once did he come in and tell me what I should be doing or whether it was right or wrong.

He carried on a good practice and wrote a book on uveitis. I could never get him to one of our conferences.

Hughes: *Why do you think that was?*

Maumenee: Well, I don't know. Maybe he thought if there was a difference of opinion the staff would defer to him and not to me.

The one thing Woods taught us was to argue with him. When I went to California, I found that most of the senior ophthalmologists had been trained in Vienna where you could never argue with the professor. The professor says, "It's so because I say it's so." Dohrmann K. Pischel, [Hans] Barkan, and Frederick C. Cordes were all trained in Vienna. I brought out the idea that you're supposed to argue. I had rounds on Monday morning, and many practitioners in town came to them. We would argue with the faculty and fight back and forth about things that went on. Woods encouraged that in all of us.

William H. Wilmer

Hughes: *What about Wilmer?*

Maumenee: Wilmer was very much the Viennese type of professor.

Hughes: *You didn't ever argue with him.*

Maumenee: I never knew Wilmer. He died before I came to Hopkins. He was reputed to have been a very fine surgeon.

Hughes: *Well, he certainly had a prominent group of patients.*

Maumenee: Oh, he did. He was a charming gentleman. He had tremendous charisma. So did Dr. Woods in his own way. Dr. Woods was a really dynamic person.

Hughes: *Had Wilmer set up the institute with the idea that it was to have a heavy research interest?*

Maumenee: Yes.

Hughes: *How did a man who had come straight out of practice get the idea that research was an important adjunct to ophthalmology?*

Maumenee: He was in the armed services in World War I, and he was head of research for the air force, because flying a plane was done by vision, not instruments. The air force had people doing basic science, and I think he picked up the idea from that.

Popsy [William H.] Welch was also extremely influential in developing the Wilmer Institute. He convinced Mrs. Aida de Acosta Breckinridge to build an eye institute like they had in Vienna. Welch gathered most of the money for the institute. Mrs. Breckinridge was able to collect only about $400,000 because Dr. Wilmer would not allow her to contact his patients. He thought it would be embarrassing to ask money of patients who were devoted to him because of the expert eye care they had received from him.

Popsy Welch went out and got $2 million.

One of the things that really irritated Wilmer and his family was that when he was sixty-five he was made to retire. Although Popsy Welch had gathered most of the $2 million that got the institute started, Wilmer, once he became chairman, collected $1 million or more for fellowships, research projects, and other things, from his patients and friends. He couldn't see why he wasn't allowed to stay on and practice here. Instead, he went back to Washington. He pointed out, "Well, why do you let Popsy Welch stay on and you don't let me stay on?"

Hughes: *Did they have an answer?*

Maumenee: No.

Hughes: *Welch emphasized the importance of research?*

Maumenee: Yes. He was a pathologist. So Dr. Wilmer set up a laboratory and hired basic scientists to work in Wilmer. One of the important things he insisted on before he would accept the chairmanship was that patient care, research, and teaching all would have to be under one roof.

His residents did very well. Ben Rones had a big practice in Washington. Townley Paton certainly became one of the leading ophthalmologists in New York. He started the first eye bank in the United States.

Hughes: *Where was it?*

Maumenee: It was in New York City. He faced great opposition to taking eyes from the dead and using them, but he accomplished it.

Wilmer trained some very fine ophthalmologists. George Heidelman in Cincinnati was considered a very capable person. And Ed Burch from Minnesota was an excellent practitioner. Cecil Bagley had a big practice in town. Angus MacLean came from obstetrics and gynecology, and he was certainly the leading eye surgeon in town, until John McLean came along.

Wilmer hired Clarence Ferree and Gertrude Rand to do physiological optics, and Arlington Krause in chemistry, and later Louise Sloan, also in physiological optics. Alan Woods, having trained with de Schweinitz, was even more interested in research. And Friedenwald came along and really did the research work.

Monday and Thursday Rounds

Hughes: *Please comment on your experience with Monday and Thursday rounds.*

Maumenee: Well, rounds with the residents and the chief of staff started with Wilmer. Apparently they were very effective rounds. Then Alan Woods came along, and he had walking rounds, seeing all the patients, on Monday and Thursday. The resident would present the case and what had been done. And then Dr. Woods would make comments about the case and what he thought ought to be done. He would do very good teaching rounds. They are still done the same way in internal medicine.

Hughes: *Did internal medicine pattern itself after ophthalmology?*

Maumenee: No, I think we all patterned after Halsted. Bedside teaching was Halsted's way of teaching.

Hughes: *Was everybody more or less on an equal plane? Could anybody interject?*

Maumenee: Yes, at least in Wilmer. We were all equal except Dr. Woods, and he was equal to all of us. But he stimulated you to think and to ask questions and to disagree with him, and then he

would say what he felt about a problem, why he thought it was a certain diagnosis, and what should be done.

Hughes: *How do patients feel about being observed by a retinue?*

Maumenee: They don't seem to mind. They think they're getting a consultation from a great number of people. It's very seldom that we say anything that would really embarrass a patient.

Only one time that I can remember—and you'll have to excuse the unpleasant language—a man had a basal cell carcinoma of his lid, and he'd let it go to the point where it had already eaten its way back into the orbit. We'd been trying to convince him to let us cut the tumor out. It doesn't metastasize; it just grows, infiltrates. But it can grow right into the brain and kill you.

So finally Dr. Woods, who was kind of brusque, got down right next to the guy's ear, because the patient was a little deaf, and Dr. Woods said, "The tumor will eat your goddamn head off unless you are operated on!" He was operated on the next day.

Our major teaching was through the senior resident, because he had had at least four years—and I think we then extended it to five years—of residency training. And he'd been away for a year learning a specialty in some place where they did something better than we were doing it. So he came back with new knowledge and new ideas.

We feel very strongly that an important part of the residency system here is residents teaching each other. We pick the brightest people we can get, and they're intensely competitive with one another. We don't try to make it that way, but they've always been head of the class, they've been valedictorian, they've been magna or summa cum laude in medical school, so they are always trying to be tops.

The senior resident guides things, and if he can't get the residents to do the work he wants them to do, he will come to the professor, or maybe one of the staff members now. But in my time they would come to me, and then I would talk to the house officer. But I would never talk to the house officer before the senior resident had tried to manage it, because that would take away his authority.

The rounds were good and residents prepared for them. They read up on all the cases that they had to present. They were told the night before which cases to present. The professor was never told what the resident was going to talk about. It

was always a surprise to us what they would bring up. [laughs]

Hughes: *Did that ever catch you short?*

Maumenee: Several times. Particularly some of the bright guys like Bernie Becker when he was here. He knew so much more about glaucoma than I did. Every time I tried to explain the pathogenesis of glaucoma, Bernie would correct me. [laughs]

Hughes: *Were there courses that went along with the residency training program?*

Maumenee: Yes. The senior resident always arranged a group of lectures and would ask the attending men to lecture at five o'clock.

Hughes: *Presumably on their areas of expertise?*

Maumenee: That's right. And the resident and the staff would give lectures, too. That still goes on. It was a strictly in-the-auditorium, slides-on-the-screen, lecture format. The audience could ask questions, but it was and is more formal than the rounds. The rounds were a presentation, and then anybody in the crowd could speak up.

Pressure to Publish

Hughes: *Was there pressure on you as a resident to publish?*

Maumenee: No. There's no pressure on any of our residents to publish, except that their colleagues were doing it.

Hughes: *Does that apply to the staff as well?*

Maumenee: It depends on what the staff's doing. If you're going to be a PhD in basic science, then you have to get grants. I had a policy that if you couldn't get grants from the NIH, you were not doing good work and you belonged somewhere else. That means you should get another job. Likewise, if after three years in clinical work you couldn't get enough patients to take care of expenses, then you ought to go somewhere else.

There are places where the chief does insist that the house staff publish papers. If they don't, they get forced out. I don't think that's right. If somebody doesn't have the imagination and the ability to do it, then they're not going to do it when they get forced out. There's an inner drive of inquisitiveness

that's born in people. They may be the most brilliant student that ever went through Hopkins or Harvard or any other place, and they may not have an original thought in their mind. They can tell you everything in every book they know of, but they never have an original idea. People in the middle of the class may have all kinds of imagination. Of course, the great combination is to be the best in the class and to have imagination, too. But these people don't come along very frequently.

Dr. Woods's Cataract Extraction

Hughes: *Do you want to tell the story of operating on Dr. Woods's cataracts?*

Maumenee: Sure. Jack Guyton was Dr. Woods's favorite resident. Jack and Dr. Woods got along just beautifully. As I have said, Jack was brilliant; he worked on papers with Dr. Woods. When Dr. Woods decided to have his cataracts done, we at Wilmer were using corneoscleral sutures when most of the ophthalmologists in the rest of the country weren't. Dr. Woods selected Jack, who was the senior resident, to do his cataract extractions, which just shocked everybody. But Dr. Woods was anxious for Jack to go ahead in academic medicine. He'd seen the results of Jack's surgery on rounds and how good the cases looked.

Dr. Woods got John McLean to come down from New York to help Jack do Woods's first eye. When his second eye was operated, he asked me to help. I was so nervous about hitting his optic nerve or putting the needle in his eye, because he was somewhat nearsighted and had a long eye, I didn't do a very good retrobulbar novocaine injection. He let out a few yells during the operation. The operation hurt him, but he was very good about it, and he really stayed still, and Jack did a good job. It was a tremendous strain on Jack as a resident to be operating on the chief.

Dr. Woods had a complication that we should have discovered and reported. The vitreous is a jelly-like fluid in the eye, and when you take out the lens there's no support to prevent it coming forward, and the hyaloid face of the vitreous is not tough enough to hold it back. Dr. Woods was in Gloucester, Virginia, at his summer home, and he called up and said, "My vision in one eye has dropped down to nothing; I can hardly see." So we jumped in the automobile and went down with a

slit lamp to look at his eye. The hyaloid face of his vitreous had ruptured and gone into the anterior chamber. That creates a pull on the ciliary body, which gave him a cystoid macular edema. That's one of the most common complications of intracapsular cataract surgery.

Later on, Don Gass, one of my former residents, gave a good, detailed description of the condition.* I published a histopathology picture of it several years before, but there was also a serous detachment of the sensory retina in the slide and I missed the cystic changes in the retina.** If you look at Figure 17 in this paper, it shows the most beautiful cystoid macular edema you ever saw. It was the first one published, but I didn't recognize it. I thought serous detachment of the retina was the problem.

The Wilmer Meetings

Hughes: *What is the history of the residents' May meeting, the Wilmer meeting?*

Maumenee: This was started at the suggestion of Frank Walsh in the late 1930s. Frank decided we ought to have a one-time-a-year explanation of what research work we were doing at Hopkins. We held it in the little auditorium we have downstairs, and it was about halfway filled. This was in 1937 or 1938. It seemed to be very popular. So the next year we had it, the room was totally filled. Then about two years later it was so overcrowded we had to move into Hurd Hall. Then that got so crowded we had to move into the new building, the Turner Auditorium, which held eight hundred people.

The meeting consisted of a series of papers on what we were doing in Wilmer in the way of clinical and basic research. Verhoeff came to each one because the Ophthalmic Pathology Club, later called the Verhoeff Society, met just before the Wilmer meeting, and many of the members would come over to the meeting. I'd drive Verhoeff over; he'd sit in the front row, and he'd comment on every paper. He would say, "I did this twenty years ago. I did this forty years ago. It's nothing new."

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* Gass JDM, Norton EWD. Cystoid macular edema and papilledema following cataract extraction. *Arch Ophthalmol* 1966; 76:646–661.

** Maumenee AE. Symposium: Postoperative cataract complications. *Trans Am Acad Ophthalmol Otolaryngol* 1957; 61:51–68, Fig. 17.

Anyway, the Wilmer meeting became a very, very popular thing. When I came back as chairman in '55, we had the auditorium totally filled, with people sitting on the steps. But then the Wills Eye Hospital, Columbia, the Mass Eye and Ear—every big eye department—started having a residents' day like ours. So spring was so full of meetings that the Wilmer meeting began to drop off in the number of people who attended. We were down to around three hundred people this year, including all the former residents who'd come back. So they're going to make it more clinical to see if we can attract more people.

We think it's a very good way to let the world know what we're doing at Wilmer, work which probably won't be published for two or three years. Much of it will never be published, because it turns out to be wrong. I used to say, "What you hear today, three years from now you'll hear is all wrong, because we are really in the first phase of looking at this, and it may turn out to be totally wrong."

Focal Point

Hughes: *Would you like to say something about what went on at Focal Point?*

Maumenee: Yes. The people at the Wilmer Institute have always gotten along extremely well and enjoyed being with one another, particularly the residents. I think it was Betty and Frank Constantine who thought of renting a house down on the water. We found we could rent it for $25 from each resident for the summer. There were probably eight or nine or ten of us that rented this house. We used to have a great time down there. It was on the Cattail Creek, which is a branch of the Magothy River which flows by Gibson Island and out into Chesapeake Bay. We got a couple of little sailboats that we put together, and we'd spend the weekend there. The facilities weren't the best in the world; nobody ever made the beds up, and cooking facilities weren't ideal, but we didn't starve. It was a place where we would get together and swim and party and have fun. Then the obstetricians started Fetal Rest, which was based on the same concept.

We invited all the house officers down to a party once. We had a big crowd, and swam, and sailed, and drank beer, and pitched horseshoes, and generally just enjoyed one another.

Hughes: *How many years did Focal Point last?*

Maumenee: It lasted the whole time I was a resident. During World War II, use decreased. And then the fellow who rented it to us decided he wanted to use it for himself. When I came back from California, I think it was not in existence anymore. But from around 1940 through '46 or so, we had it every year.

Taking the American Board of Ophthalmology Examination

[Interview 2: May 15, 1990, the Maumenees' home in Stevenson, Maryland]

Hughes: *Dr. Maumenee, do you have any stories about taking the ABO [American Board of Ophthalmology] exam in 1943?*

Maumenee: At Johns Hopkins we didn't have any particular classes or instruction for the board exam. You were on your own to study if you wanted to. About the only thing I studied for was optics, because I didn't know any optics at all. Bill Hughes, who later was head of the eye department at the University of Illinois, and I set up an optical bench and practiced on that enough to learn a little optics, not very much.

I went to New York to take the exam. A pair of examiners examined you all day long. The examination was all oral and lasted for three days. Dr. [C. S.] O'Brien from Iowa was the bear of the American board. Everybody was deathly afraid that he would examine them, because he was so tough. Sure enough, my luck was to get Dr. O'Brien. John McLean, who'd been my roommate, was his assistant, so that made me feel a little more at ease.

I had a very good time, and after half an hour or so I decided I'd argue with O'Brien just as I did with Alan Woods. O'Brien would ask me a question and I'd answer it, and he would act like it wasn't correct, and I would argue with him about why my answer was better.

Hughes: *Did he like the arguing?*

Maumenee: Yes, he got to where he enjoyed it. We had a great time. He was probably one of the brightest guys in ophthalmology of his time. He was one of the full-time academic people.

Hughes: *He was one of the first, wasn't he?*

Maumenee: That's right. Wilmer was full time before him, but O'Brien was certainly one of the first. The department he built up in Iowa was certainly one of the two or three best in the country.*

Next I got Al Braley as an examiner. He was interested in external diseases and infection. We had a great time because I was very interested in herpes, because I'd done research work on it. Braley thought that was fantastic.

Hughes: *I thought that examiners weren't supposed to examine in their field of expertise.*

Maumenee: I've always felt that they should. I feel that the poor examiners are the ones who don't know what they're talking about. If you're good, you can ask difficult questions. If a candidate's shaky, you can go back to easier questions that you think anybody should know. I used to hate to examine in optics because I didn't know any optics at all, and I was just miserable. If the answer was the same as the answer on the card, I passed them. [laughter]

Hughes: *You didn't have any choice about the subject in which you examined?*

Maumenee: No.

I did all right on my board exam; I don't think I made the best grade over all. Al said he gave me the best grade of anybody there [on his part of the exam]. I don't know what grade O'Brien gave me. Then I went in to [John] Dunnington, and he examined me in optics and refraction. I made some stupid errors, because when I got out I remembered I'd said the wrong thing. [laughs]

Hughes: *Was refraction emphasized at Wilmer?*

Maumenee: No. The word was that the people at Wilmer never knew how to refract. We taught them surgery, and we taught them pathology, and we taught them basic medicine. We thought refractions should be done by technicians. So refractions were not our forte.

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* For more on the Department of Ophthalmology at Iowa, see the oral histories in this series with Drs. Thomas D. Duane, Phillips Thygeson, and Paul Boeder.

III. WORLD WAR II RESEARCH, 1944–1946

Chemical Warfare

Hughes: *Prior to your military service, you had done research on chemical warfare.*

Maumenee: I worked on two research projects with the OSRD [Office of Scientific Research and Development], a civilian branch of the armed forces. As a resident, I worked on chemical warfare with Jonas Friedenwald. We were trying to find a cure for mustard and nitrogen gas. Just after that, I worked on viral diseases.

Hughes: *Tell me about your work on mustard and nitrogen mustard gas.*

Maumenee: We weren't getting anywhere with an antidote for mustard or nitrogen mustard. We went up to Du Pont, and Friedenwald would correct the chemistry of its top-flight synthetic chemists, the brightest people they had. We got several other big companies to try to make an antidote, and we couldn't make one.

It came out that the Germans had developed a nerve gas and were going to fly over and poison everybody in England. It turned out to be dinitrofluorophosphate, DFP. So we put that in the eyes of rabbits, and the pupils constricted right away. So Friedenwald said immediately, "This must be a parasympathetic product, and if we put atropine in, it'll neutralize it right away and it won't be harmful at all." So we put atropine in the animals and then dropped

dinitrofluorophosphate in the eye, and the pupil didn't constrict and it didn't bother them at all. So that was our contribution to chemical warfare.

In World War I, whole companies were knocked out with mustard because it was so irritating to the eyes that people couldn't see. A lot of people got it in the lungs, and it killed them. Mustard just neutralized the army. We were afraid that when the Germans invaded Normandy in World War II, that they were going to have the waters mined with mustard or nitrogen mustard gas. They are actually an oil that vaporizes very rapidly.

We had a ship anchored in Algiers that had mustard gas on it. The Germans didn't know that and they bombed the ship. The mustard oil got in the water, and when the seamen jumped into the water, they got the mustard on their clothes. A destroyer picked them up, and within half an hour nobody on the destroyer could see because the air conditioning circulated the fumes. So they had to send out people with gas masks to rescue the ship.

Hughes: *Weren't you also doing studies of the actual histological effect of the gases on the cornea?*

Maumenee: Yes. They didn't really help. We were trying to find products that would neutralize the gas. Irv Leopold, a good friend of mine, was doing the same thing at the University of Pennsylvania.

Hughes: *So were Drs. David Cogan and Morton Grant at the Howe Laboratory of Ophthalmology.* Did you have any communication with them?*

Maumenee: We would meet with them occasionally. Irv was the only one who thought he found something. He used antibiotics to cut down on the severity of mustard burns.

Bacterial Warfare

Maumenee: I went into bacterial warfare because of Murray Sanders, who was head of defense in bacterial warfare. He was at Columbia and I knew him.

I bumped into Murray in Washington, and he said, "What are you doing?" I told Murray I was working on chemical

* See the oral history in this series with Dr. Cogan, pp. 50–51.

warfare, and I was getting tired of people asking me what ailment I had, why I wasn't in uniform like all my friends. He said, "If you go into the army or the navy, I'll get you into the most exciting research you've ever done." Well, I knew he was a bacteriologist, so I pretty well surmised what it was. It was bacterial warfare. He called up one day and said, "The navy will take you." So I went to Camp Detrick in Frederick, Maryland, specifically to do research on bacterial warfare. I entered as a lieutenant j.g. [1946] instead of lieutenant commander because I hadn't passed my American boards.

That's where I did the study on tularemia.*

Hughes: *You were working with tularemia with the idea that it might be used in warfare?*

Maumenee: Yes. We had botulism, we had a botulinum toxin, we had tularemia, we had bubonic plague.

Hughes: *Why had these particular micro-organisms been chosen as potentially useful in bacterial warfare?*

Maumenee: I guess Fothergill, who was head of Camp Detrick, and the higher-up people decided those were the ones to work on.

Hughes: *How were you working on them?*

Maumenee: We were culturing them and putting them in animals and seeing what it took to kill them. For instance, in tularemia, we wanted to see if somebody wore a mask over the nose and didn't breathe in the organism, would he get tularemia if we put it in the eye? So we put the tularemia agent in the eye, and it ran down the nasolacrimal duct, and the animals died. I also injected it into the vagina of animals, and they absorbed it too. So it showed that mucous membranes absorbed the tularemia and you couldn't protect against it.

When they took the micro-organisms up in an airplane and exploded them in a bomb, the heat from the bomb and the descent through the air made the organism sterile by the time it hit the ground. The only thing that would work was botulinum toxin. They went into the muddy fields where they had spread botulinum toxin around, and were taking the water and injecting it into the abdominal cavity of mice. It took the mice two or three days to die from botulism. They

* Downs CM, Coriell LL, Pinchot GB, Maumenee AE, et al. Studies on tularemia. I. The comparative susceptibility of various laboratory animals. *J Immunol* 1947; 56:217–28.

also got bacterial infections because of a lot of micro-organisms in the water.

My only contribution in the year and a half that I was in bacterial warfare was that I read in Duke-Elder that chickens had striated muscle in the iris, and the botulinum toxin paralyzes only striated, not smooth, muscles. So I injected the toxin into the anterior chamber of chickens, and within five minutes the pupil dilated widely.

Hughes: *So that was a good test.*

Maumenee: It was a good test if you could get a needle into the anterior chamber of a chicken. [laughter] I wrote it up, and that became the official first test for botulism. We got word that the Germans were going to send buzzbombs full of botulinum toxin into the reservoirs and poison everybody in England.

Hughes: *Which they never did.*

Maumenee: Which they never did.

Hughes: *Hadn't biological warfare been outlawed after World War I?*

Maumenee: Oh, yes.

Hughes: *The United States government didn't believe that anybody was going to hold to the agreement?*

Maumenee: It's still doing research on bacterial warfare. I don't know if they've gotten any further, but I tell you, I got so fed up with it because it was worthless when we were doing it.

Hughes: *Was Camp Detrick the only place where such studies were going on?*

Maumenee: As far as I know. They were so secret that they wouldn't tell you anything.

Serving on a Hospital Ship

Maumenee: I was so bored with not getting anywhere at Camp Detrick that I told Dr. Woods. He said, "Let me see what I can do." There were four or five people who were consultants to the surgeon general of the army, and he was one of them. He got me on one of the five new hospital ships that came out towards the end of the war. My ship was the *Tranquility,* of

all names, and there was the *Hope,* that you probably know of, and the *Benevolence,* and I've forgotten what the others were. We were the first ship out.

It was a good time on the ship. We had twenty-four nurses and eighteen doctors. [laughs] We had a mechanical cow [an apparatus for mixing powdered milk and water], and we had a safe aboard. Dr. Woods said, "Now, don't you get yourself cashiered out of the navy by ever drinking while you're there." We left Brooklyn, and everybody came out before dinner the first night with a cocktail except me. They said, "You dope, what do you think those safes are for in your cabin?" Each officer had a safe, and only you and the steward had the combination of your safe.

We toured the South Pacific, and every time we got near Hawaii the engineer would blow up a boiler and we'd have to go in for repairs. [laughter]

Hughes: What were you supposed to be doing?

Maumenee: It was a hospital ship. We had a thousand beds.

Hughes: So casualties were being flown in?

Maumenee: Yes. There'd be a little makeshift hospital on an island, and we'd go in and take care of people. If it was a real catastrophe, we would take a thousand wounded soldiers back to San Francisco, because they had a good naval hospital there. Captain Bart Hogan, who was a psychiatrist, was the chief medical officer. He would let us operate. Bob Brown was head of surgery, and he had been a professor of surgery at the University of Pennsylvania. He was a very good surgeon, very capable.

On one occasion, when one of the boilers blew up, one of my friends from Tulane that I'd run against on the track team was a commander and had a command car at his disposal whenever he came into Hawaii. So he gave me the keys to the car. When the ship went in for repairs, we'd get a couple of steaks and take the car and have a nice picnic on the beach with some of the nice nurses. [laughter]

One exciting thing that happened is that we picked up the survivors of the *Indianapolis* that carried the atomic bombs to Guam. The Japanese hit it with torpedoes on both sides, and the ship went down in fifteen minutes with a crew of about 1,500 people. Their communication was blown out and they didn't have time to get a distress signal off. So when the navy

didn't hear from the ship, they started searching, and after three days they began to find people floating in the water. They picked them up and brought them to Guam, where we picked up several hundred of them. They were in terrible shape after being in the water that long.

Hughes: *What could you do for them?*

Maumenee: A lot of them had photokeratopathy, like skiers get, because they were in the South Pacific where there was a lot of ultraviolet radiation off the surface of the water. It gave them corneal burns. We gave them medication and kept the eyes closed until they healed after several days. The general medicine people took care of the pneumonia and the gangrene and the other problems until we got them into San Francisco.

Hughes: *Did you learn anything medically or surgically from your experience on the hospital ship?*

Maumenee: No. It was as close to being in jail as anything, except that Bob Brown and I would invite a couple of nurses to sit out on the deck before dinner. We'd get a quart of ice cream, scoop half of it out, fill up the carton with whiskey, and have cocktails before dinner. [laughs] We'd come in and everybody would laugh; it was obvious that we were feeling pretty good. We played volleyball with a medicine ball to keep in condition. We practiced target shooting because medical officers could carry a pistol if we went to one of the islands. With the boat rocking back and forth, we hit the rail more than we did the target.

We had a couple of scares. A submarine had sunk one of our hospital ships, and we had word a submarine was trailing us. We were headed back for San Francisco, and they turned us around and sent us a hundred miles off the coast of Tokyo soon after the atomic bombs had exploded.

Hughes: *What was the idea?*

Maumenee: The Marines were going to invade Japan. The atomic bomb scared the Japanese so much they threw in the white flag right away.

Hughes: *Which is what was hoped.*

Maumenee: That's right. We would have had to invade and thousands of people would have been killed if it had not been for the bombs.

IV. PROFESSOR AT THE WILMER INSTITUTE, 1946–1948

Hughes: *Well, in 1946 you went back to the Wilmer as an associate professor.* Was there ever any thought in your mind of going somewhere else after the war?*

Maumenee: I had thought of possibly going back to Birmingham to try to pick up my father's practice, but it had been so long from '38 until the war ended that there wasn't much practice left. So I went back to Wilmer with the idea that I'd stay a year or two and then go into private practice.

Hughes: *So you weren't thinking of an academic career?*

Maumenee: Well, I was fifty-fifty. I didn't know whether I'd rather stay in academics or whether I'd rather go into private practice. The pay at Hopkins was $3,000 a year. After I returned to Baltimore, I went to the meeting at the National Society for the Prevention of Blindness [now called Prevent Blindness America] and was kind of daydreaming and remembered this article I'd read of Peter Medawar's and decided to work on the immune reaction.

I went to Jonas Friedenwald. I said, "Jonas, look, I'm really bored to death here. I'm not doing anything. I'm just seeing a few patients, and it's terrible." He said, "Ed, let me tell you something. You make up your mind what you want to do and go do it, or somebody else will take up all your time and you

* Dr. Maumenee was an assistant professor at Wilmer from 1943 to 1946.

won't have any for yourself. I'll tell you what you do. You write the atlas on pathology.* That'll keep you busy." So I started working on that, and working in the lab.

Hughes: *How much pathology had you had at that point?*

Maumenee: We rotated through pathology for a period of three months, with Jonas Friedenwald. You did the rotation at night after seeing the patients, and you did all the eye pathology that came through the Wilmer. If you wanted to, you could go over to the pathology lab and continue to look at pathological specimens. I enjoyed pathology, so I would go over when Jonas was checking out the residents' reports on the specimens that had come in during the week. I guess Dick Green will tell you more about it than anybody.**

Hughes: *So you knew a fair amount of pathology.*

Maumenee: Well, I wouldn't be called an expert. I wouldn't be called a Lorenz Zimmerman or a Dick Green or a Norman Ashton or a Jonas Friedenwald, but I knew more than 90 percent of the ophthalmologists in the country.

Jonas and I got along so well together; I just enjoyed him and admired him so much. If I have a mentor or father figure, he was it. I think he was the greatest guy I ever knew.

* Friedenwald JS, Wilder HC, Maumenee AE, et al. *Ophthalmic Pathology. An Atlas and Textbook.* Philadelphia: Saunders, 1952.

** Tapes of interviews recorded with W. Richard Green, MD, and others associated with Dr. Maumenee are on deposit at the Foundation of the American Academy of Ophthalmology.

V. CHAIRMAN, DIVISION OF OPHTHALMOLOGY, STANFORD MEDICAL SCHOOL, 1948–1955

Offer of the Chairmanship

Maumenee: It was interesting the way I was offered the job at Stanford. Emile Holman, a Hopkins graduate who became chairman of surgery at Stanford,* came to Baltimore to interview Jack Guyton about going to Stanford. Jack was the star who operated on Dr. Woods, and he was frequently invited as the guest lecturer at meetings, and he was brilliant. As an afterthought, Emile asked to see me. I didn't know who Emile Holman was, so I sent word to him that I was busy doing an experiment on rabbits, and if he wanted to see me he could come up to the fourth floor where I was working. That impressed him, because he'd done work on tissue transplantation.

Hughes: *He could have been offended.*

Maumenee: I know, but he was such a nice guy.

I showed him what experiments I was doing on corneal transplants. Part of this experimentation was to demonstrate that the cells in the cornea, which were called keratocytes, were not specific cells but could be derived from macrophages from the bloodstream. These latter observations were done by

* For more on Holman and the history of Stanford Medical School before it moved to Palo Alto, see the oral history of *Frank L. A. Gerbode: Pioneer of Cardiovascular Surgery.* Regional Oral History Office, University of California, Berkeley, 1985.

freezing the cornea with a brass rod that had been dipped in absolute alcohol in which the temperature had been brought down to minus 78 degrees Centigrade with dry ice. The brass rod was then applied to the cornea, killing all the corneal cells in that area. Before the freezing, the animals had been given heavy injections of methylene blue intravenously so that most of the macrophages had phagocytized the dye. When the cells regenerated into the frozen area of the cornea, methylene blue could be seen in the cells—that is, the new keratocytes—thus showing the keratocytes were not specific cells but could be replaced by cells in the bloodstream. Later, people in microbiology and anatomy found that macrophages can convert into fibroblasts. Cells can convert depending on the media they're in. So when they grew into the mucopolysaccharide of the cornea, they became keratocytes and the cornea would clear. But I could tell where the cells came from because in the microscope I could see the methylene blue in them.

Emile was very interested in all of that, so he practically offered me the job at Stanford on the spot. I said, "I'm busy writing a book on pathology, so I can't come for a year." He said they'd wait.

Hughes: *Did Hans Barkan stay on as head of the division* for an extra year?*

Maumenee: Barkan stayed on until I got there.

Hughes: *Barkan didn't have much say in who was his successor?*

Maumenee: That's true in practically every school. They don't put the chairman of the department on the search committee to choose his successor. Many schools don't even have an ophthalmologist on the committee.

Hughes: *What's the thinking there?*

Maumenee: I don't know. They think that the ophthalmologist may have a friend who is a candidate for the position and be prejudiced in his favor. The committee reads all your publications and interviews people about how you administered things and how your students did and how you handled your department. It's much easier to become a chairman if you go away, like Morton Goldberg did, and develop a good department than it

* The Division of Ophthalmology at Stanford did not become a department until 1959 when it became a part of the Pacific Medical Center after Stanford moved its medical school to Palo Alto. For more on this subject, see the oral history in this series with Dohrmann K. Pischel.

is if you stay at Hopkins, because everybody knows you and all your faults, and doesn't want to take a chance on you. So they practically always take somebody from the outside. Besides, that stops inbreeding.

I had to borrow $5,000 from my mother for the move to San Francisco. Dohrmann Pischel was so wonderful; he let me stay in his house for the summer months when I got there in July, because they went to their summer place. It gave me an opportunity to find an apartment and get settled.

Hughes: *Were you the only one considered for the position at Stanford?*

Maumenee: I don't know; they don't tell you.

Hughes: *You immediately thought Stanford was a good thing to do?*

Maumenee: I accepted it right away. I think I talked to Dr. Woods and Dr. Friedenwald, and they thought it would be a good experience for me.

Hughes: *You were very young to be head of a division.*

Maumenee: My birthday is September 19, 1913. I was offered the job in 1947, so I was thirty-three. But I did not go until July of 1948, so I was thirty-four until September 19. I didn't know California and thought it would be nice to live there. I decided to go out and try it, and see if I liked academic life.

Changing Procedures in the Division

Hughes: *Did you go with the idea that you might make your career at Stanford?*

Maumenee: I was planning to stay there. I enjoyed it so much because, as I say, there was just so much I could tell them. None of the ophthalmologists at Stanford had had any experience in pathology. They didn't know any pathology at all. They were still operating in the old Viennese style from down below instead of up at the head of the table.

Hughes: *Why did the Viennese operate that way?*

Maumenee: They thought they could make a better section with the knife. They opened the eye with the knife.

Hughes: *Where were they placed?*

Maumenee: They would sit at the operating table on the patient's right side at about the level of his shoulders.

Hughes: *Dr. Bettman told me that the tradition at Stanford before you came was for the surgeon to sit on the patient's right, regardless of which eye was being operated.**

Maumenee: I made them sit at the head of the table so they could use either hand freely.

Hughes: *Another thing he said—another Viennese tradition—was that you didn't argue with the professor. The professor's word was law.*

Maumenee: That's right.

Hughes: *You changed that as well.*

Maumenee: That's right. Stanford had [Karl D.] Lindner come out from Vienna. Lindner made some remarks that some of the younger people didn't agree with, so they asked him why he thought that was so. Lindner said, "It's so because I said it is so." [laughter] I changed that. I got them to argue with me. I started the Monday conferences that became popular.

Hughes: *Tell me how the conferences worked at Stanford.*

Maumenee: I told the residents and participating ophthalmologists to bring their most interesting patients in, and told all the staff to come to the meeting on Monday mornings. We'd bring in the tough cases and look at them under the slit lamp. We'd discuss them and the treatment. It wasn't long before we had only standing room in the lecture room. Everybody in town and out of town, from Oakland and whatnot, came to the Monday conferences.

Hughes: *Was the resident given responsibility to work up the cases?*

Maumenee: We didn't have the senior residency system there. We just had three-year residents. They did work the patients up, yes, or the doctor could bring his own patient in. Many of the doctors who had patients they couldn't diagnose or handle would present them, and we would discuss them and tell them what to do. So they got a free consultation.

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* Interview with Jerome W. Bettman Sr., MD, May 2, 1990.

At Stanford, I didn't have the choice of residents that I had at Hopkins. I primarily had people who wanted to live on the West Coast. They were smart and they were good, but they weren't nearly the caliber of the people who applied at Hopkins. I got Art Jampolsky to start a lab in strabismus. I got Frank Winter to start in pathology. I got several other residents to start research projects.

Hughes: *Research was new for Stanford, was it not?*

Maumenee: For the eye department anyway.

Hughes: *Both Dr. Pischel and Dr. Bettman are older than you. Had they been considered to head the division?*

Maumenee: I'm sure Dr. Pischel thought that he was going to get the job.

Hughes: *And of course he did, eventually.*

Maumenee: He did. He was such a gentleman. He always helped me as much as he possibly could. He had a big private practice in San Francisco, and I think he really enjoyed that more than having to teach ophthalmology.

Hughes: *He told me in the interviews that he hated administration.**

Maumenee: Yes. Jerry Bettman, I think, would have loved to have the job.

They were all cooperative. I didn't have any feuds with any of them. In the first place, I wouldn't see any patient unless he was referred to me. I didn't want a refraction practice; I wanted a referral practice. So the first year, my secretary made more than I made. [laughs] Nobody referred patients. But after the Monday conferences got under way, then people began to refer patients, and it just snowballed until by the time I left I was doing twelve operations in the morning and had a very large practice.

Hughes: *Was there any resentment? You could have been looked upon as a young upstart from Hopkins turning things topsy-turvy.*

Maumenee: I think Fred Cordes was the only person who got furious with me. He invited Duke-Elder over to a conference. They brought in a patient with a tumor of the iris and the ciliary body, and they were all calling it tuberculoma. I looked at it and said, "That's a necrotic melanoma. It's not an infection at

* See the oral history in this series with Dr. Pischel, p. 101.

all." Duke-Elder argued about it being a tuberculoma, and I argued with him. That irritated Cordes no end, that I would speak up to the great Duke-Elder [laughs] and not say, "Yes, sir," like they did in Vienna. Then when Jonas stayed with me instead of staying at the Bohemian Club, Cordes really got furious.

Stanford Faculty Members

Hughes: *Did it concern you that ophthalmology at Stanford was a division rather than a department?*

Maumenee: Not really.

Art Bloomfield was head of medicine, and he was trained at Hopkins too. He was one of Jonas Friedenwald's very good friends. He was a very brilliant, very capable guy. Becoming very good friends with the head of surgery and the head of medicine helped me tremendously with the faculty in general.

Emile [Holman] said right away, "I don't know a thing about ophthalmology, not the first thing. Don't you come up here asking me any questions. If you want to do something, you go ahead and do it. I'll back you up. If it comes to finances, I'll have to get into the decision, but if it comes to running the department, you run it the way you want to run it." When I said, "Look, I want to run the eye pathology," the chief of pathology said, "No, we're not going to give up the eye pathology; the next thing you know, you'll have to have an ob/gyn pathologist and an orthopedic pathologist, and it will ruin our whole department. We won't give it up." Emile went up and talked to him and got him to give it up. So we started the eye pathology department.

Hughes: *What comparison can you make between ophthalmology as you knew it at Wilmer and what you found when you arrived at Stanford?*

Maumenee: I think the principal contrast was that the staff at Hopkins was much more interested in basic science and in basic disease. It was certainly a better medical school than Stanford, and had really great people in every department. Stanford had a much better university than Hopkins. There was a general surgeon, Victor Richards, about my age, who was brilliant.

Hughes: *They were clinically oriented.*

Maumenee: Yes. Nobody had a lab. Nobody had a grant from the National Institutes of Health. I had the first grant at Stanford from the National Institutes of Health.

Hughes: *Was NIH the major support for your research at Stanford?*

Maumenee: Yes. Money was pouring into the National Institutes of Health. They would call up and say, "Can't you think of a reason to ask for money? We've got all this money left over in the budget, and if we don't spend it, we won't get it next year." The staff at the Institute of Neurological Diseases and Blindness would call me and say, "Just write any kind of research grant, but get it in."

We got money for animals and equipment. That's why we did all the corneal transplant work. Nobody else had a lab for surgical research.

Hughes: *Did you get people at Stanford interested in research?*

Maumenee: I wouldn't say we became a Hopkins. Certainly the people in basic science were doing some research work. It wasn't a total void, but the clinicians were much more interested in clinical work and didn't go into the laboratory at all.

Hughes: *Were there any full-time departments at Stanford then?*

Maumenee: The clinical departments and divisions were all geographic full time. I was paid $5,000 a year and was allowed two days a week practice.

Hughes: *That was pretty standard?*

Maumenee: Yes. It was great fun. I probably enjoyed that stage of my life more than any other.

Hughes: *Why do you say that?*

Maumenee: First of all, I was young and energetic. I could bring so many new things to the community that other people didn't know anything about. It's a big ego booster to tell great, outstanding people like Otto Barkan that he was all wrong.

Maumenee: Otto Barkan's reputation in surgery for congenital glaucoma was such that patients were sent to him from all over the world, because he was getting great results. We got quite a large number of patients with congenital glaucoma because they didn't know the difference between Hans Barkan and Otto Barkan. I had quite a number of congenital glaucoma cases, and that's how I got interested in it.

Hughes: *Where was Otto Barkan?*

Maumenee: He was at St. Mary's Hospital [in San Francisco].

Hughes: *He wasn't a presence any longer at Stanford?*

Maumenee: Otto Barkan never was. Hans was at Stanford, but Hans never did goniotomies.

Hughes: *What was Hans Barkan doing while you were head of the division?*

Maumenee: He saw private patients. He did practically no operations.

Hughes: *He didn't enter into any of the administrative activities?*

Maumenee: No. He had an office across the street and he never came over. I never saw him unless I went over to his office.

Bob Shaffer and I were the best of friends. We played tennis together, and I stayed in his summer home when he went out of town. I have great respect for Bob.

Hughes: *Was he at Stanford?*

Maumenee: No, he was at the University of California.

Mike Hogan was one of my best friends, and I knew Sam Kimura and Lee Garron and the whole group at the University of California. I used to tease them all the time that I was delighted they could do all the refractions; I'd do all the surgery. [laughter]

Hughes: *Did you have any contact with Phil Thygeson in the Proctor Foundation?*

Maumenee: Not too much. I knew the other people on the University of California staff better than I knew Phil. I respected what

he'd done. He had a fantastic knowledge of external diseases; he knew them all and was very good in diagnosis and treatment. But for someone as capable as he and who was primarily a microbiologist, he made few major breakthroughs in antibiotics or culturing the trachoma agent or the adenoviruses. But he wrote extremely clearly, and several external diseases are named for him. I felt he was essentially a basic scientist and not primarily an ophthalmologist. I don't know if he saw patients except for external disease.

Hughes: *Dr. Thygeson had a private practice in San Jose.*

Maumenee: Well, I didn't know much about his practice except that it was primarily external disease. I don't think he operated, did he?

Hughes: *He didn't like surgery.*

Maumenee: I know at Columbia he was strictly in the lab, so he limited himself to external disease.

Hughes: *Did you regularly attend the meetings of the Pacific Coast Oto-Ophthalmological Society?*

Maumenee: Yes, I always went to them. I didn't have the money to go East to the AOS [American Ophthalmological Society], so I didn't initially join the AOS. I went to the Academy and gave papers at the Academy, and I gave papers at the ophthalmic section of the AMA, too.

Hughes: *The university wouldn't pay your way to those meetings?*

Maumenee: No, I had to pay my own way.

Hughes: *What was the quality of the papers at the Pacific Coast?*

Maumenee: They were pretty good. They were primarily clinical; there was not very much basic work being done.

Hughes: *Were you involved in the debate over whether Stanford Medical School should move to Palo Alto?*

Maumenee: Not really.

Hughes: *I know the move happened after you left,* but I thought maybe there was preliminary talk.*

* Stanford Medical School moved in 1959 to Palo Alto, where the general campus is located.

Maumenee: And I was ready to move down there. Palo Alto is a wonderful place to live, and I was looking forward to moving down there.

The Eye Bank

Hughes: *You started an eye bank while you were at Stanford. Was it the first one on the West Coast?*

Maumenee: No, there were several others. There were people running them out of their homes and charging for the eyes. There were no rules and regulations. It was terrible.

Hughes: *When you say an eye bank, you mean strictly to store material?*

Maumenee: No. It's really a misnomer because you could only keep the eyes for twelve hours. If they could get permission to take the eyes, the residents would go down at twelve or one o'clock at night and enucleate the eyes from the cadaver and bring them up and we'd operate.

Hughes: *So there was really no banking involved at all.*

Maumenee: No, there was no banking. We had a secretary who kept track of where the eyes came from and who got them. Then the eyes went to pathology and we tracked them down through that. We looked at the eyes in pathology.

Hughes: *Were these eyes being used strictly for transplantation?*

Maumenee: Strictly for transplantation.

Hughes: *So you weren't doing any pathology.*

Maumenee: Oh yes, we would then put them in formaldehyde and send them up to pathology lab. But by the time they got there, frequently there was a lot of autolysis in the retina and in the other tissues in the eye, so it made it hard to interpret.

Hughes: *Was the eye bank a new concept?*

Maumenee: The first eye bank had been started by Townley Paton in New York City. It was before I was a resident, because during my residency we got eyes through the eye bank in Baltimore and did corneal transplants. Townley Paton was criticized because some people did not think that cadaver tissues should be used.

There may have been an eye bank at Stanford before I arrived. I organized it with my residents going out to get the eyes. It really wasn't a new concept to have an eye bank; that was something that was already being done. [Vladimir P.] Filatov was the first to use cadaver eyes to perform transplants. There is a large eye institute in Odessa named for him.

I told potential donors that the eye is one of the few places in the body where you can't take a biopsy. Therefore, there were many diseases that we didn't understand, because we only saw the end stage of the disease. So when people had glaucoma or other serious problems, I would tell them to leave their eyes to the eye bank.

Hughes: *Presumably, since you felt the need to write a letter to the American Journal of Ophthalmology, you felt eye pathology banks needed some encouragement.**

Maumenee: That's right.

Eye Pathology

Hughes: *Eye banks relate to another interest of yours: correlation of the clinical appearance with the histopathological picture.*

Maumenee: That's right. That was really my major contribution in ophthalmology. I correlated what I saw clinically with what would be seen in pathology under the microscope. I was asked to lecture in many places because I knew the pathology of the lesion, and other people hadn't had any training in pathology and didn't know what it was. They would look in with the ophthalmoscope and imagine it was this or that, but they really wouldn't know for sure until they'd looked at it under the microscope. So much research I did was because I'd done clinico-pathologic correlations.

Even when I went to Stanford, I ran the pathology department. Frank Winter and then Horst Mueller took it over for a while, but I always went over and checked everything out. I taught pathology to each of the residents that went through Stanford. They did it all during the week, and then I'd go over on Saturday and we'd sit down and go over the specimens.

* Maumenee AE. Eye pathology banks. *Am J Ophthalmol* 1968; 65:628–29.

A veterinarian from Oakland, Seymour Roberts, used to come over every Saturday to our sessions on eye pathology. He became the first ophthalmic veterinarian. Then he began to bring dog eyes with pathology that he didn't understand. So we got to see that animals could have some of the same diseases that humans have.

Hughes: *And all this time you were underlining the importance of . . .*

Maumenee: Clinico-pathological correlations.

Hughes: *So all your residents were imbued with that idea.*

Maumenee: That's right.

Hughes: *Dr. Patz told me today that correlation was one of your major contributions in macular disease, that people prior to you had tried to classify macular disease, but not on the basis of actual histological changes.**

Maumenee: That's right. I did the first classification on a pathological basis.

Treating Epithelial Invasions**

Hughes: *You wrote a paper entitled "Epithelial Invasion of the Anterior Chamber," which was published in 1956.*** One of the points that you made was to differentiate among different lesions that resemble epithelial invasion in the anterior chamber. Please explain what they were and why it was important to differentiate among them.*

Maumenee: There are three things that can happen if your wound is not tightly closed after a cataract extraction or after an injury or corneal transplant or some other type of situation that causes the anterior chamber to be sliced open. The first is an epithelial ingrowth or downgrowth. There, the epithelium of the conjunctiva grows into the opening in the scleral wound and onto the back surface of the cornea and the anterior and posterior surfaces of the iris. It covers Schlemm's canal, and eventually, eyes with this condition are almost always totally

* Interview with Arnall Patz, MD, May 15, 1991.

** The discussion of epithelial invasions was recorded in Interview 3, May 16, 1991, and the transcript inserted here for better continuity.

*** Maumenee AE, Shannon CR. Epithelial invasion of the anterior chamber. *Am J Ophthalmol* 1956; 41:929–42.

lost. They go blind, they become painful, and get high pressures because Schlemm's canal is closed off. In the past, everyone had always said, "Never touch an epithelial ingrowth because you'll stimulate it to grow more rapidly and the patient's eye will be lost."

The second type of problem is when the epithelium grows in through the wound and instead of forming a sheet that grows onto the back of the cornea, it forms a cyst. Those cysts grow very slowly and may take twenty-five years or so before they really bother the patient—that is, grow so large they fill the anterior chamber and cover the pupil. But you never know whether they're going to grow very rapidly or very slowly. So if you see an epithelial cyst, it's much better if you take it out. The only difficulty is that if you don't take all of the epithelium out, you can convert it into an epithelial ingrowth. Of course, then you have a greater problem.

The final type is an epithelial pearl. These are very, very rare. That is where a little piece of epithelium falls off during an operation, is washed into the anterior chamber, and forms a little clump of epithelial cells that don't cause any trouble.

I wrote the paper primarily because I saw a patient who had been operated on elsewhere. About a quarter of his cornea was covered with epithelium that I could see under the slit lamp. I didn't see anything on the surface of his iris. So I opened his eye again and took a curette and scraped all of the epithelium off. When you do that, you almost always get some edema of the cornea above where you scraped off the cells from the back of the cornea. But that can scar down and not bother the patient and not progress. This patient kept his 20-20 vision, and over the period of time that I followed him, he never progressed and the lesion never recurred. I reported the case because it was the first time anyone had ever cured an epithelial ingrowth.

There had been suggestions that radiation should be given to kill the epithelium. Also, people put various chemicals into the eye to try to kill the epithelium, but they damaged the endothelium also, so that was no good. Patients were referred to me from all over the country and Europe. By the time most of the patients were referred to me, epithelium covered half of the cornea and also the iris.

Now, when I was at Walter Reed [Hospital], it occurred to me that using the xenon light for photocoagulation, and later the laser, we could burn the surface of the iris, and if there was epithelium there, it turned white just like your blouse. If it

was stroma—and you can have a stroma downgrowth, that is, fibroblasts, that looks very much like an epithelial downgrowth—it turned brown. So this was a good diagnostic method.

I wrote this up in the second paper on this subject, written in '64, when I described that technique as a method of diagnosis and gave a summary of the number of cases that I had treated and the results.* About 25 percent of the patients came out with good visual acuity. About 25 percent of them remained about the same. In another 25 percent, the cornea went totally cloudy because enough of the epithelium had been removed that the cornea became opaque. On some of those patients I did a corneal transplant, and they could see again. In the latter 25 percent, the epithelium continued to advance, and the eye was lost.

Hughes: *Did you have a photocoagulator at Hopkins?*

Maumenee: Yes, but I didn't have any cases of epithelial downgrowth. Fortunately, in my years of practice I never had a single epithelial downgrowth in the patients on whom I had done the primary operation.

Hughes: *Was this more of a problem in the old days when sutures were less fine?*

Maumenee: Yes, and when sutures weren't used, then the incision frequently would open up. Georgiana Theobold wrote a long article about epithelial ingrowth and the percentage of patients who had this. Ken Swan from Oregon wrote an article about using a limbal-based versus a fornix-based conjunctival flap. A fornix-based flap means that you cut the conjunctiva right at the limbus and dissect it back up. Then when you close the wound, the epithelium is there to grow into the wound, because it's been cut and the wound is open if it's not closed tightly. They had a fairly high percentage of epithelial ingrowth from that. When they switched to a limbal-based conjunctival flap—that is, making the incision in the conjunctiva several millimeters above the limbus and then covering the sutures with the conjunctival flap—the occurrence of epithelial downgrowths practically disappeared.

Hughes: *Anything more to say on this subject?*

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* Maumenee AE. Treatment of epithelial downgrowth and intraocular fistula following cataract extraction. *Trans Am Ophthalmol Soc* 1964; 62:153–66.

Maumenee: I wish we had a better method of doing it. I wish that people would refer patients early, because the early cases are the ones that are really successful as far as the patients' vision is concerned.

Hughes: *I'm surprised that the patients didn't complain sooner.*

Maumenee: Oh, the patients complained and went back to the doctor, but the condition is rare enough that doctors didn't always recognize it. Even when they recognized it, they hoped that it was not an epithelial downgrowth and wouldn't do anything until they saw it grow. By the time it had grown down over half the cornea, then you had very little chance of taking all the epithelium off and not having the cornea become cloudy.

Hughes: *One of the techniques you tried—it's mentioned in the 1964 paper—is the use of the cryoprobe. How well did it work?*

Maumenee: It worked quite well. It even worked better than curettage. They developed mechanical cryoprobes that could take the temperature down much lower than I could take the brass rod, which I stuck into dry ice and absolute alcohol. If you injected the anterior chamber with air so that the aqueous wouldn't carry the cold away, you could actually see the cornea when you were freezing it. It only took a second for the whole thickness of the cornea and the epithelium to freeze. You could see the border of the epithelium on the back of the cornea, where it froze. If you came around the next day, you could see the epithelium had fallen off into the anterior chamber. Freezing and refreezing it would kill the cells. Then at other times we would open the eye and actually freeze it from the inside rather than curetting it, because it was more accurate. Because you'd have an ice ball, or frozen area, on the back of the cornea, you could tell just where you'd frozen, and you could put the probe right next to that ice ball to freeze the area immediately adjacent.

Hughes: *Weren't you skeptical about the use of the cryoprobe for extracting the lens?*

Maumenee: Yes. I'll start by telling you about the cryoprobe. Dr. Walter Kornblueth came over from Israel and worked with me in 1947 when I was at Hopkins. When I moved to San Francisco, he moved out and worked with me for about three years. We were trying to find out what keratocytes were. Were they specific cells from the stroma of the cornea, or

were they just any kind of cell that in the medium of the mucopolysaccharide in the cornea would become keratocytes?

I took dry ice and put it in absolute alcohol, and then would chill a probe that was made like a cone and was about five millimeters in diameter at the tip and flat. We would freeze a rabbit cornea all the way through, including the endothelium. We did a lot of studies on that. We had also frozen the nerves and could watch their regeneration into the cornea.*

I tried to treat a couple of patients with glaucoma by freezing the ciliary body and killing it. But the cold was not great enough to penetrate through to kill the ciliary body, and the technique didn't work. [Tadeusz] Krwawicz from Poland used a bronze probe in the same way we did, dried off the surface of the lens after opening the eye, and touched the lens with the cold probe. The probe would stick to the lens, and you could pull the lens out that way. It was less likely to break the capsule.

Then various types of mechanical probes were invented, including one by S. P. Amoils in South Africa and one that [Charles] Kelman invented. Several probes used freon and other gases that would take the temperature way down. In a paper at the American Ophthalmological Society, somebody presented work on the use of the cryoprobe for cataract extraction. I said, "That may work all right, but I break so few capsules using a good pair of capsular forceps that I don't think that the probe is really necessary." I was wrong again. Since I hadn't thought of the idea and since I was doing all right with forceps, I didn't see any reason for taking a chance of having the cryoprobe touch the back of the corneal endothelium and damage it. After the development of smaller probes, I found the cryoprobe easier to use than forceps, and I switched over. So the cryoprobe pretty much became the routine method of cataract extraction.

* Maumenee AE, Kornbleuth W. Regeneration of the corneal stromal cells. I. Technique for destruction of corneal corpuscle by application of solidified (frozen) carbon dioxide. *Am J Ophthalmol* 1948; 31:699–702.
Maumenee AE, Kornbleuth W. Regeneration of the corneal stromal cells. II. Review of literature and histologic study. *Am J Ophthalmol* 1949; 32:1051–64.
Kornbleuth W, Maumenee AE, Crowell JE. Regeneration of nerves in experimental corneal grafts in rabbits. Clinical and histologic study. *Am J Ophthalmol* 1949; 32:651–59.

Fluorescein Angiography*

Hughes: *Please tell me how you got into fluorescein angiography.*

Maumenee: The fluorescein angiography came about because I had a patient who was a policeman from Sacramento. He was sent to me with a diagnosis of melanoma of the choroid. It didn't look like a typical melanoma, but it was an elevated lesion and I had to agree that it was probably a melanoma. The people in Sacramento enucleated his eye and sent the pathology to me.

As I mentioned, I started the eye pathology laboratory at Stanford. I was the only person at Stanford who had an NIH grant for research, because the dean and the trustees thought it would be insulting to the Stanfords if they accepted money for the school from anybody except them.

Hughes: *An amazing philosophy. [laughter]*

Maumenee: Anyway, this case really upset me because the policeman then lost his job because he only had one eye.

The next patient who came along was a Mr. Granger, who was a truck driver. He had a lesion that looked very much like the first patient's, whose name I've forgotten. I remembered that [Hans] Goldmann was using intravenous fluorescein to study the flow of aqueous into the eye. He would inject it into the vein and then watch it come into the anterior chamber. Since it was innocuous, I decided that I would use it. I used the slit lamp with a cobalt blue filter, which activated the fluorescein to make it fluoresce, and injected Mr. Granger with this. When I did, the whole tumor lit up like a sunburst. So I knew it was a hemangioma. He is the first person who ever had a pre-enucleation diagnosis of a hemangioma, and he was the first person ever to be treated for a hemangioma. I used transscleral diathermy to obliterate the tumor because we didn't have photocoagulation at the time, and his vision returned to normal. I followed him for years, and he never had any further difficulty with it.

Hughes: *How did you determine the dose of fluorescein?*

Maumenee: It came in an ampule of 10 percent fluorescein, and I just pulled it up in a syringe and injected it.

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* The discussion of fluorescein angiography was recorded in Interview 5, October 14, 1991.

Hughes: *Is that what Goldmann had been doing too?*

Maumenee: That's what he had been doing. Unfortunately, it had some impurities in it, and the patients frequently would have projectile vomiting and a cold sweat and whatnot. With malpractice being what it was with [the lawyer Melvin] Belli in California, I would get into a cold sweat myself, thinking this patient was going to die.

Hughes: *Malpractice was a problem even in that era?*

Maumenee: This was about 1954. Belli was really terrible.

Hughes: *Did you use fluorescein on any other patients at Stanford?*

Maumenee: We did. I presented Granger, and we used it on a number of patients. Milton Flocks, who was a resident at the Veterans Hospital, which was supervised half by Stanford and half by the University of California, came to all of our conferences. Jerry Bettman, a member of the Stanford staff, was very interested in retinal-vascular flow. Milt worked with Jerry and injected fluorescein intravenously in animals and did fluorescein cinematography as the retinal vessels fluoresced. Milt published this work in 1959, two years before Novotny and Alvis published their paper.*

Hughes: *Who are they?*

Maumenee: [H. R.] Novotny and [D. L.] Alvis were two medical students at the University of Indiana who were working under John B. Hickman, professor of medicine. He suggested that they use fluorescein to look at the vessels. He was doing a lot of studies with various dyes. They took pictures, and their pictures were so beautiful they were turned in to Derrick Vail for the *AJO* [*American Journal of Ophthalmology*], and he turned the paper down, saying that this technique was insignificant. So they published it in *Circulation*. They have been given credit for starting fluorescein angiography because their picture of fluorescein in the retinal vessels was good, and people overlooked the papers by Flocks and me because we did not have the word fluorescein in the title.

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* Flocks M, Miller J, Chao P. Retinal circulation time with the aid of fundus cinephotography. *Am J Ophthalmol* 1959; 48:3–6.
Novotny HR, Alvis DL. A method of photographing fluorescence in circulating blood in the human retina. *Circulation* 1961; 24:82–86.

Actually, earlier, in 1959, before Novotny and Alvis published their paper, I gave a paper with Angus MacLean in which we described some five or six patients that we had diagnosed using fluorescein angiography.* We had studied macular changes extensively by injecting fluorescein and looking with an indirect ophthalmoscope with a cobalt blue filter, but we didn't have a photographer who could take good pictures.

Hughes: *And you didn't publish right away either.*

Maumenee: I didn't publish until 1959.

Hughes: *I looked at the case reports in that paper, and you mentioned the use of fluorescein angiography in only two patients, on Granger in 1955, and on a Hopkins patient in 1958.*

Maumenee: We couldn't get good fluorescein pictures at Hopkins, so we didn't have pictures in the paper. We described the use of fluorescein in the diagnosis of fundus pathology.

Hughes: *Who popularized the technique?*

Maumenee: Well, after Novotny and Alvis published their beautiful pictures and the description of the filters they used—various people developed various filters to enhance the fluorescence—it became very popular. When Don Gass, who was a resident of mine, saw the results with various macular lesions, he became very interested, and so did Lawton Smith. Lawton then went to Duke where he did some work, but Don Gass did more work than anyone else.

Don was one of the brightest residents I ever had. He was superb and meticulous in indexing everything he ever read and every case he had ever seen. So he did the fluorescein angiography and made the clinical pathologic correlations later. A number of these patients were elderly, and he got them to sign up [to donate their eyes], and he got their eyes and looked at them under the microscope and correlated what he found with the fluorescein.

Hughes: *One of the pluses of fluorescein angiography was that you could draw that correlation?*

Maumenee: Right.

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* MacLean AL, Maumenee AE. Hemangioma of the choroid. *Trans Am Ophthalmol Soc* 1959; 57:171–94.

Macular Degeneration

Maumenee: At Stanford and in the *Transactions of the Pacific Coast Oto-Ophthalmological Society,* I classified macular degeneration for the first time.* I made some mistakes, but a good bit of the classification turned out to be correct. But it's seldom quoted anywhere because the journal has such a limited circulation and I never published it in the *AJO* or *Archives.*

Then, at the annual meeting of the American Academy of Ophthalmology and Otolaryngology in about 1956, we had a symposium on complications of cataract surgery. I described the histopathology of what turned out to be cystoid macular edema.** As I look back at that slide now, it shows beautiful cystoid macular edema, but it also shows a serous detachment of the pigment epithelium. I was more interested in that, and so I called it a serous detachment of the pigment epithelium and did not bring attention to the cystoid changes. Don Gass brought attention to the cystoid changes in the retina.

Hughes: *Would you say it was a result of the fluorescein angiography that you became interested in macular disease?*

Maumenee: I became interested in it because nobody tried to differentiate different types of macular degeneration. I could see with the slit lamp that there was a serous detachment of sensory epithelium and a serous detachment of pigment epithelium. With the pigment epithelium detachment, you would get a hemorrhage, and that progressed to a disciform macular degeneration.***

Hughes: *These were the subclassifications of macular degeneration?*

Maumenee: Right.

Hughes: *You were first to make those distinctions?*

Maumenee: Right.

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* Maumenee AE. Serous and hemorrhagic disciform detachment of the macula. *Trans Pacif Coast Oto-Ophthalmol Soc* 1959; 40:139–60.

** Maumenee AE. Symposium: Postoperative cataract complications. III. Epithelial invasion of the anterior chamber, retinal detachment, corneal edema, anterior chamber hemorrhages, changes in the macula. *Trans Am Acad Ophthalmol Otolaryngol* 1957; 61:51–68.

*** Maumenee AE. Clinical manifestations (macular diseases). Symposium: macular diseases. *Trans Am Acad Ophthalmol Otolaryngol* 1965; 69:605–13.
Maumenee AE. Pathogenesis (macular diseases). Symposium: macular diseases. *Trans Am Acad Ophthalmol Otolaryngol* 1965; 69:691–99.

I don't know if I told you a Verhoeff story about a young boy whom I saw with Coats's disease. He also had a disciform degeneration of the macula. After many consultations, many people thought it was a retinoblastoma and suggested that his eye be removed. It was removed, and on histologic examination, it was a typical disciform degeneration—fibrous tissue and whatnot from the bleeding under the macula. I presented this case at the Ophthalmic Pathology Club. Verhoeff told me that I was totally wrong and that this didn't have anything to do with what they called at that time senile disciform changes, as opposed to the hemorrhagic changes that they called juvenile.

Verhoeff had actually described this condition a number of years earlier. The reference is in my article on macular degeneration.* He took the slide to his hotel that night and with Dave Cogan went over it. He came back to the Ophthalmic Pathology Club the next day and said he had gone over the slide thoroughly the night before, and that I was right and he was wrong: it was a typical disciform degeneration of the macular.

Hughes: *I didn't know that Verhoeff ever retracted. [laughter]*

Maumenee: That's the only time I ever heard him apologize and retract. So I was very puffed up and pleased.

Hughes: *Dr. Green told me that one of the results of sharper differentiation of macular disease was a drop in the number of enucleations.***

Maumenee: That's right.

Hughes: *Was that because people were mixing up other conditions with melanoma?*

Maumenee: Yes. You see, there is a layer of pigment epithelium and then there is Bruch's membrane. As people get older, that membrane thickens and it also becomes calcified. Since the rods and cones are nourished by the choriocapillaris, which is in the choroid just outside of Bruch's membrane, blood vessels would try to get in to give nutrition to the rods and cones, and they would grow through these cracks in Bruch's membrane.

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* Verhoeff FH, Grossman HP. Pathogenesis of disciform degeneration of the macula. *Arch Ophthalmol* 1937; 18:561–85.

** Interview with W. Richard Green, MD, May 17, 1990.

They would have very thin walls and they would hemorrhage, causing a black mass in the macular area.

At that time, the thought was that you had to enucleate right away for any melanoma or the patient would die from it, because such a high percentage of patients died from true melanomas. So a number of eyes with hemorrhagic macular detachment were enucleated. That's why we have so much pathology on it, because of the mistaken diagnosis.

Treating Glaucoma with Goniotomy

Hughes: *Dr. Bettman thought that you arrived from Wilmer with doubts about the value of goniotomy.**

Maumenee: I did.

Hughes: *Can you tell me why?*

Maumenee: Because I'd never done any. [laughter] I didn't see how you could open Schlemm's canal and have it stay open. You could cut open a blood vessel in your arm and it would heal over; you wouldn't bleed to death. I couldn't see how you could open up a canal that had blood vessels going into it and have it stay patent.

Karl Ascher had described the aqueous veins, and by compression around the eye, you could squeeze the eye and push the aqueous out, and the vessel, which had been red, would turn white with aqueous. You could actually push blood back into Schlemm's canal if you lowered the pressure in the eye enough. Then the pressure in the aqueous veins would be higher than in the aqueous, and you could see the blood flow into Schlemm's canal by looking at the anterior chamber angle through a special gonioscope contact lens.

Hughes: *Did goniotomy work?*

Maumenee: It did work.

Hughes: *So were you eventually convinced?*

Maumenee: Oh, yes.

Hughes: *And you performed goniotomies?*

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* Interview with Jerome W. Bettman Sr., MD, May 2, 1990.

Maumenee: Yes. I think I made the first movie of a goniotomy.

Hughes: *Where is it?*

Maumenee: Somebody stole it.

I had a good friend, Cliff Bennett, whose father-in-law made a fortune during the war by making stepladders for the landing barges. I told Cliff's father-in-law that we needed a camera for taking movies of eye operations. So he let me buy the best Kodak movie camera that was available. We took all of our own movies during operations, because we didn't have a photographer. We also bought a fundus camera and took our own fundus pictures. Milton Flocks used the movie camera to record the first fluorescein angiography research.

Hughes: *Were goniotomies performed at Hopkins at that time?*

Maumenee: No.

Hughes: *When you went back, did you introduce it?*

Maumenee: Yes.

Hughes: *How were they treating glaucoma at Hopkins?*

Maumenee: They were doing just regular glaucoma filtering operations, trephines or iridencleisis. They didn't see very many patients with congenital glaucoma. These patients weren't being sent to Wilmer.

The Possibility of an Eye Institute on the Stanford Campus, Palo Alto

Hughes: *Dr. Bettman thought that you had ideas about forming an eye institute in Palo Alto.**

Maumenee: I did. I had a patient, Arthur Bailey, who was a multi-multi-millionaire. He was a very good friend of [W. Averell] Harriman and also a good friend of the head of the Chrysler Motor Company. He talked them into getting together $2 million for me to build an eye institute when we moved to Palo Alto, if I'd come back to California.

Hughes: *This occurred after you had returned to Wilmer?*

* Interview with Jerome W. Bettman Sr., MD, May 2, 1990.

Maumenee: Yes.

So Dean Alway came to Baltimore to my house, and we made arrangements for me to go back to Stanford. I was ready to go back because I had been making a lot more money out there. I figured that if they weren't going to let me do what I wanted to do at Wilmer, I would go back and build my own institute in California.

Hughes: *This was shortly after you had returned to Hopkins?*

Maumenee: Yes. Then Wallace [Sterling], who was the president of Stanford, said that they couldn't do that because it would make ophthalmology better than any other department in the school. So the idea fell through, and I didn't get the eye hospital.

Marriage (July 1949) and Children

Hughes: *The last question about the Stanford period concerns meeting your first wife [Anne Elizabeth Gunnis]. How did that come about?*

Maumenee: I went down to a meeting in Los Angeles, and I've forgotten how I got a date with her. We had a great time, and I enjoyed her very much. She had been married before, but she and her husband were separated. So she got a job in San Francisco and finally decided she'd been separated long enough. She went to Reno and got a divorce, and we got married.

Hughes: *What year?*

Maumenee: July of 1949.

Hughes: *Do you have anything more to say about the Stanford period?*

Maumenee: We had two kids—our daughter, Elizabeth [Libby], in April of 1950, and our son, Alfred Edward Maumenee III [Trip], in August 1951. He's married and has two children and lives in Mobile.

Hughes: *What about Libby?*

Maumenee: Libby was a real liberal. She went to Bryn Mawr High School, and she was always a good student. She was accepted at Duke, and Duke is supposed to be the second most difficult co-ed school after Stanford to get into.

After graduating from college and working for a while, she was accepted at several law schools and decided to go to the University of Maryland. She worked for several judges while she was in law school, and then went to Annapolis where she joined the legal staff and became assistant attorney general in environmental protection for the state of Maryland. Finally she got fed up with the fact that most people in government didn't work hard enough, so she joined one of the leading law firms in Baltimore.

My son, Trip, was also a late starter. He worked for a while and then went to night school at Hopkins, and competing with the graduate students he made a B+ average. He eventually went to work for my brother Rad, who was president of Alabama Drydocks. He's now project manager for the new company that bought Alabama Drydocks.

I was working very hard in ophthalmology and did not spend enough time with either Trip or Libby. Also, their mother had multiple sclerosis during their teen years and was handicapped in her activities. She had two automobile accidents and then stopped driving, and then she couldn't walk, and then she was totally bedridden. Finally, I had to put her into a nursing home where she lived for fifteen years before she finally died—the most miserable thing I've ever seen in my life.

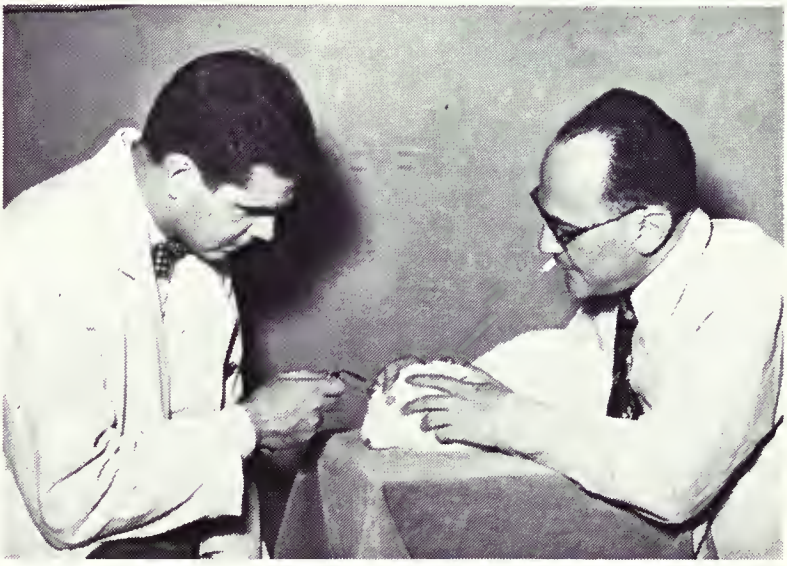
PHOTOGRAPHS

Mother
Lulie Martha Radcliff Maumenee, 1950s

Father
Alfred Edward Maumenee I, ca. 1940

Young A. Edward Maumenee II

A. Edward Maumenee at about age 10, dressed as a page to the King of the Mardi Gras

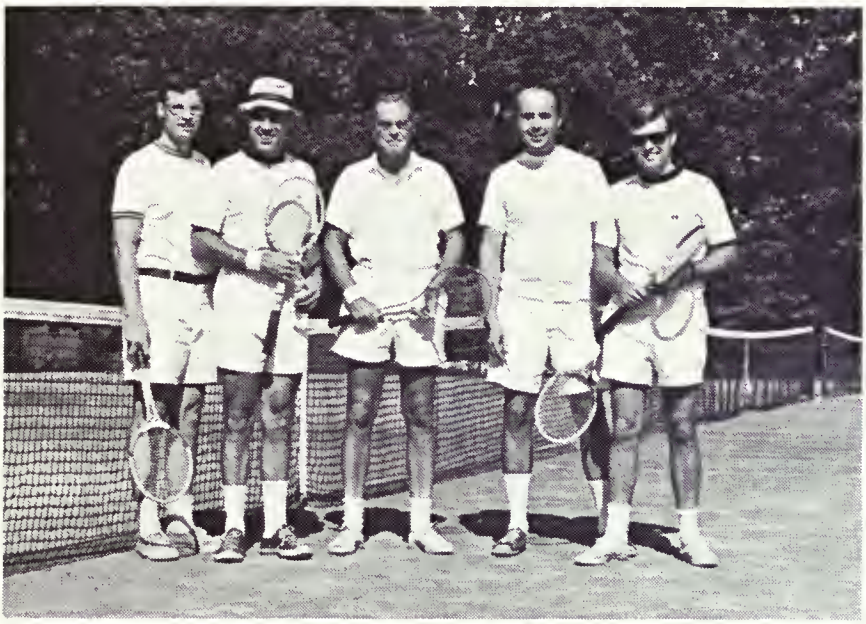


As a resident, performing chemical warfare studies with Jonas Friedenwald, ca. 1942–1943 (Photo courtesy of W. Richard Green, MD)

Jonas Friedenwald, 1943 (Photo courtesy of W. Richard Green, MD)

Caricature drawing of the young resident

Ophthalmic Pathology Club Meeting (named Verhoeff Society in 1964), early 1950s. John S. McGavic, John McLean, Helenor Wilder, A. Edward Maumenee, and Merrill J. Reeh. (Photo courtesy of W. Richard Green, MD)



A. Edward Maumenee and his residents
Ronald E. Smith, C. P. Wilkinson, "The Prof," Michael Burg, and Walter J. Stark, 1969.
(Photo courtesy of W. Richard Green, MD)

Alan C. Woods, ca. late 1930s (Photo courtesy of W. Richard Green, MD)

Receiving the Research to Prevent Blindness Award from President Richard M. Nixon, 1971
(Photo courtesy of W. Richard Green, MD)

A. Edward Maumenee fishing in Alaska, late 1950s

President of the American Academy of Ophthalmology, 1971 (Photo courtesy of W. Richard Green, MD)

Monday conferences at the Wilmer Ophthalmological Institute, ca. late 1960s (Photo courtesy of W. Richard Green, MD)

Speaking at the Jerusalem Seminar on the Prevention of Blindness, 1971 (Photo courtesy of W. Richard Green, MD)

Dedication of the Jules Stein Institute, ca. early 1960s
Clockwise from left: Jules Stein, (front center), unidentified, Maumenee, and actor Hugh O'Brien (Photo courtesy of W. Richard Green, MD)

Receiving an award for leadership in international ophthalmology from the Societas Ophthalmologica Mediterranea, ca. 1987

Maumenee's children, 1993
Front: Anne Elizabeth Maumenee Nelson
Back: Alfred Edward Maumenee III, Niels Kim Maumenee, and Nicholas Radcliff Maumenee
Portrait in background is of Maumenee's great-great-grandmother on the maternal side

VI. CHAIRMAN, WILMER OPHTHALMOLOGICAL INSTITUTE, 1955–1979

Return

[Interview 3: May 16, 1990, Wilmer Ophthalmological Institute, Baltimore, Maryland]

Hughes: *The next step is to discuss your return to Wilmer as chairman of the department and director of the institute. Please sum up why you decided to come back.*

Maumenee: In San Francisco, I was on a geographic full-time basis in which Stanford University Hospital supplied me with a small examining room, and a small room for my administrative work, and another small room for my secretary, and one of the residents who would stay on after he finished his residency and work with me. Things were going well and my practice increased out there. I was doing quite well financially and also having a very interesting practice because it was strictly a referral practice of difficult cases.

But I did not have the facilities for research or clinical work that they had back here at Hopkins. And I didn't have the collaboration with people like Jonas Friedenwald and Frank Walsh and Alan Woods and people in other parts of the medical school. At that time, Hopkins was small enough that you could go to practically anybody in the school with an idea, and if it was in their area, they would help you work it out. That just wasn't true at Stanford. I complained enough to

Alan Woods and Jonas Friedenwald that when they asked me if I'd come back, I felt too embarrassed to turn the offer down, even though the salary was about a third of what I was making at Stanford.

Hughes: *Were they considering anybody else?*

Maumenee: Yes, but I don't know who else was considered. Dr. Russell Nelson, who was the head of the hospital, told me I had been selected, and then I got a formal letter from Dr. [Lowell] Reed, who was president of the university, offering me the job.

Hughes: *Do you think Friedenwald was considered?*

Maumenee: Friedenwald was not really interested in administration. He had a relatively small practice and didn't operate very much. So he wouldn't have stimulated a big clinical program. But I was excited because I thought I could stimulate the clinical part and he could run the research part.

Policies Regarding Race and Sex

Hughes: *Do you think the fact that Friedenwald was Jewish played any role?*

Maumenee: I'm sorry you asked that question, but it is true that at that time Hopkins was very prejudiced and they had never had a Jewish chairman of a department.

Hughes: *How long did that policy hold?*

Maumenee: I really can't tell you who was the first Jewish professor of a department here.

Hughes: *You were unusual at Hopkins in that you did appoint Jews senior resident when apparently that had not been the policy in the past.*

Maumenee: That's not 100 percent true, because Ben Rones under Wilmer, and Bernie Becker under Woods, were Jewish. I did not let religion come into my choice of people. I took them on the basis of their ability and basic scientific knowledge. I did find out if a person could get along with other people. If not, it would practically wreck the department.

Hughes: *So personality had to be a factor.*

Maumenee: Personality was a factor in my decision of whom to ask to come on as a resident.

Hughes: *How did you feel about women?*

Maumenee: I felt that Hopkins was one place in the country that had basic research and the facilities to teach people how to teach and how to become chairmen of departments. As I mentioned to you, O'Brien in Iowa and Wilmer at Wilmer were the only full-time chairmen of eye departments. I felt Wilmer had an opportunity to improve ophthalmology throughout the country. So I chose people primarily on their ability. I felt that the females applying at the time were really not competitive scientifically or in class standing. In all probability, they were going to get married and have children like they should, and, running the family, wouldn't be able to spend full time as professors. So it wasn't until late in my chairmanship that I took on a couple of females.

Hughes: *Did they work out all right?*

Maumenee: They did, but they have never become chairpersons of university departments. As a matter of fact, I don't know even today of a female chairperson of a department of ophthalmology. There are some doing superb academic work, like Rene [Dr. Maumenee's ex-wife, Irene, an ophthalmologist at Wilmer], and either she or some of her fellows will probably become chairpersons in the near future.

Debate over the Use of Profits from Clinical Care

Hughes: *I understand that there was a controversy over the terms of your acceptance of the chairmanship.*

Maumenee: When I accepted the chairmanship, I made an agreement with the dean, Phil Bard, and with the head of the hospital, Russ Nelson, that any funds that we made from taking care of clinical patients would remain in the Wilmer Institute for me to use to build up our research department and other things. I got my appointment sometime in the summer of 1955.

Dr. Barry Wood, who had been an all-American football player at Harvard, was just a fantastic guy and was head of medicine at the University of Washington in St. Louis. He came back to Hopkins to be vice-president in charge of medicine, over the dean. He came back only on the basis that all money that came in from private practice would come to

his office and would then be distributed according to where he thought it ought to go. When I came back to the Wilmer meeting, which was in May [1955], and they told me that this was what was going to happen, I said to the dean and to the director of the hospital, "Okay, you tell me right now whether you are going to keep your agreement with me or with Barry Wood. I'm not coming back unless you keep your promise that the money comes to me. I'll just stay at Stanford because you've promised." Both Bard and Nelson said, "Our promise to you came first. So that's the way it's going to be."

Then Barry told them, "Either you cave in and give me the money, or I won't accept the appointment." Here I was, young to be head of an eye department, and the great Barry Wood, whose appointment at Hopkins had been enthusiastically written about in the paper, was going to leave because I wouldn't agree. So Dr. Woods told me, "Get a lawyer and sue him! Take it to the board of trustees. They'll agree with you, because it was a promise on their part. They won't back down." I said, "Prof, if I do that, I'm going to be a failure here because people will blame me for making Barry Wood leave. And I'm just not going to do it."

So I wrote Barry a letter saying, "Barry, this is my final say. I will not give you the money. I'll make the budget out so you won't get a penny." So I made the budget out every year so there wasn't a penny left over. When Tommy Turner became dean, he went along with what I wanted to do. He said, "Okay. You made the agreement, and you make the budget. If there's no profit, Barry Wood doesn't get anything." Every year we came out exactly to the penny. [laughter] So I never spent any of Wilmer's endowment money, because they couldn't make me spend it. When I turned the department over to Arnall Patz, I had $5 million in endowment funds.

Hughes: *That's quite a nest egg.*

Maumenee: See, I wanted to put up a new building for clinical work because we were so crowded by the time I was ready to retire. Patients came from all over the country, and they had to stand up in the halls; there were no seats for them. It was terrible. So I said, "We've just got to have more space," and they said, "Maybe the next professor won't want it." So I said, "Well, I'll take an early retirement." So at sixty-two I said, "I'll retire. You find somebody else." They didn't find anybody until I was sixty-five.

Hughes: *The new building was the Maumenee building?*

Maumenee: I started an advisory board to help raise money. Arnall came in as chairman and was a fantastic money-raiser. He raised $12 million, I think, for the building.

Departmental Fellowships

Hughes: *Dr. Miller spoke of your effort to attract medical students.* Sometimes the vehicle, and I think it applied in his case, was a summer fellowship in the Wilmer Institute.*

Maumenee: The Seeing Eye Foundation, which is a foundation for the Guide Dogs for the Blind, had a fairly large amount of money coming in. As a matter of fact, they had enough donations that they wrote to people and asked them not to give any more money; they had all they needed. They asked me to be on their scientific advisory committee, and when I accepted, they were looking for unique things to do. I said, "A unique thing to do would be to pick out medical students who have shown a real aptitude for research, and pay their way through medical school if they are willing to do research in ophthalmology in their spare time." I think we started out with $6,000 a year and cut it back to $3,000 a year.

Hughes: *It was more than just a summer fellowship.*

Maumenee: We had that program plus summer fellowships. We were a well-endowed department because of the money that Wilmer had collected from his patients. There were about six fellowships available—the Vanderbilt, the Harkness, the Copeland. There were many other fellowships available to which people had given $100,000 or something like that. The interest from these endowments was used to pay the fellows for their summer work.

Hughes: *The hope was to interest medical students to enter ophthalmology?*

Maumenee: That's right. It was to show them that good research work was going on in ophthalmology.

I immediately began to look for people who were outstanding investigators. Dr. Maurice Langham was one of the key people on the faculty at the Institute of Ophthalmology [in London], so I offered him a job and he came over. Dr. [Arthur M.] Silverstein, who was at the Armed Forces

* Interview with Neil Miller, MD, May 16, 1990.

Institute of Pathology in Bethesda, came on the faculty. Then I got Dr. John Dowling from Harvard to come down to do neuro-physiology. So we had people at Wilmer in immunology, physiology, glaucoma, and neurophysiology of the retina. The fellows and students could work under my direction or other members of the faculty.

Hughes: *How successful were the fellowships in attracting students to ophthalmology?*

Maumenee: Very. Some of our best house officers came out of that program, because after we had seen them work and gotten to know them for two years or so, we knew how good they were and took them.

Rounds and Conferences

Hughes: *We haven't talked about the Thursday morning house staff rounds.*

Maumenee: Alan Woods made rounds of patients in the hospital on Monday and Thursday. Instead of making rounds on Monday, I started a conference. I still made rounds every Thursday on the patients. The saying was that if the residents had bad results, they hid the patients in the bathroom so I couldn't see them. [laughter]

Hughes: *Is there anything to say about Thursday morning rounds?*

Maumenee: Well, those were interesting because we would walk around and they'd show me each patient. I could tell how the chief resident was doing, because he was doing most of the surgery. If he was getting a lot of bad results, then I knew that he needed help. The younger residents didn't do too much of the surgery, but if they were getting bad results, I could tell. Students could also learn a lot, because I would ask questions of the first- and second-year house officers, so they had to be prepared to discuss the subject in front of their colleagues. They didn't want to look bad, so they studied pretty hard on the diseases they thought we would be presenting on rounds so they'd have an answer and be able to make some intelligent remarks.

Hughes: *Did the research staff, people like Arthur Silverstein and Maurice Langham, attend rounds as well?*

Maumenee: It's just like oil and water; it's very difficult to get the clinicians to mix with the basic scientists. I invited them, and they'd come and there wouldn't be anything particularly in their line of work, so they'd come maybe once or twice and never come back. So it didn't really work out, in spite of the fact that the Woods Building was built strictly for research and there were supposed to be no clinical patients there unless they were being studied. It didn't work; I thought there would be a complete mix of clinical and basic science people.

As a matter of fact, we even tried to have a research residency where the person would take a year of clinical work and then take a year of research, and then he would take another year of clinical work and another year of research. It would take him a bit longer to get through. He wouldn't do surgery; he would just do medical ophthalmology. Only about three people took that curriculum, and they all felt they were second-rate ophthalmologists because they weren't doing surgery, so we stopped the program.

Hughes: *Do you know of instances where it has been possible to mix basic scientists and clinicians successfully?*

Maumenee: Oh, yes. Bernie Becker is an excellent example. He was a very excellent basic scientist and very excellent clinician. The residents who went on to take chairmanships were very familiar with research and clinical work.

Hughes: *Then there were the Saturday morning neuro-ophthalmology conferences, which I guess Frank Walsh started?*

Maumenee: Frank Walsh started them, and he loved them, and he never missed one if he was in town. They were very popular. The neurosurgeons and neurologists and many of the medical students and house officers came, and they were very, very, very good.

Hughes: *Did you usually attend?*

Maumenee: I attended some. I was never particularly interested in neuro-ophthalmology. I knew enough to do neuro-ophthalmology at Stanford because there was nobody else on the staff to do it, but I was more interested in the operative side of eye problems. Uveitis was something I could treat. Most of the neurological problems, if any treatment was done, was done

by the neurosurgeon or the neurologist and really didn't fall into treatment by the ophthalmologist.

Hughes: *Dr. Green told me that at his clinical/pathological conferences you frequently made controversial statements to get others to speak.**

Maumenee: That's right. I used to argue with Dick all the time.

Hughes: *You had your favorite targets then.*

Maumenee: Yes.

Hughes: *Somebody said that you wouldn't pick on people who you knew couldn't make a repartee.*

Maumenee: That's right. I never tried to embarrass anybody. If they knew less than I knew, I tried to make them speak out and give their side of the story.

Administrative Work

Hughes: *How would you describe your administrative style?*

Maumenee: My administrative style with house officers was to turn the job over to the senior house officer in the fifth year. I made the residency into a five-year program instead of a four-year program, giving one resident a year off to go somewhere else to get special training. Then I added another house officer, making a total of five, thinking that they would have more time for research. But they didn't; they just filled it up with clinical work and they were no different than they were before. But it did give the senior resident a chance to spend a year in some special research laboratory or in some clinical field. He was in charge of organizing all the lectures, all the rounds, all the care of the clinic patients, making decisions about who was to operate and how it was to be done. As I mentioned, I never interfered unless he said, "This is something I'm not able to get this young man to do." I think there were only two house officers that I fired.

Hughes: *What about administration, in the sense of the inevitable decisions that you as director and chairman had to make?*

* Interview with W. Richard Green, MD, May 17, 1990.

Maumenee: At first I worked strictly on what I thought was best. I made decisions on what should be done. I went around the institute at least once a month and tried to go around every week. I walked around to the people in the basic science buildings and saw how they were doing, what they needed, what they were accomplishing.

Hughes: *Did they come to you if they had a problem?*

Maumenee: Oh, yes. They primarily came to me when they didn't have money or space. But they didn't come to me for basic science because they knew much more about their science than I did.

Hughes: *Were you pretty good at getting funding for research?*

Maumenee: Yes. Whenever an organization or a research foundation was established that gave money, I seemed to be able to get on the advisory committee. I always saw to it that Hopkins got its share of funds.

Hughes: *Was the bulk of it coming from NIH?*

Maumenee: For basic research, yes. But for endowed chairs I obtained private funds. Each of the heads of the various specialties had endowed funds for salaries. I got the Odd Fellows to support Dr. Silverstein. We had a fund already established for glaucoma, and I gave that as a base for Maurice Langham's salary, and then he could get more funds by getting grants from the NIH and drawing part of his salary from that. For Dr. Dowling I got a patient to give lots of funds. So each of the basic science people who were running a section had an endowed chair.

Basic Scientists

Maurice E. Langham

Hughes: *Do you care to go into more detail about what Maurice Langham, Arthur Silverstein, and John Dowling were doing? Do I have the order right in which they arrived?*

Maumenee: Yes.

Hughes: *How was Dr. Langham brought here?*

Maumenee: I went to a meeting in Knokke, Belgium. That's a little town outside of Brussels where [Sir Stewart] Duke-Elder had arranged for a conference on the cornea. There I met Dr. Langham, and he presented some very excellent work. After talking about the work he was doing in glaucoma, I thought he would be an excellent person to come here. I asked him if he would come and he agreed. Duke-Elder got furious, because in England that's not done; you first ask for a professor's permission to ask somebody to come. Duke-Elder wrote me a very stern letter saying he wouldn't speak to me again because I came to his house for dinner and then stole his best man.

So I wrote to Norman Ashton, who was a pathologist and later became the leading person in research in the Institute of Ophthalmology in London, and asked him how I could make up to Duke-Elder, because I didn't know that I wasn't supposed to make an offer to one of his staff without his permission. Norman said Duke-Elder had given a lecture in Canada in which he said, "When you find somebody for research, you go after him any way you possibly can, and when you get him, you pamper him and let him have whatever he wants, and push him and protect him in any way you want to. You cheat, steal, and do anything to get the person you want." [laughter] So I copied that section from Duke-Elder's talk and sent it to him, and I said, "Sir Stewart, I just read your paper, and I did what you said should be done." He wrote back a very jovial letter and said, "You win. Okay." [laughter] We became very good friends after that.

Hughes: *How did Dr. Langham work out?*

Maumenee: Dr. Langham is a very smart, capable, and inventive person. I think he has a fault that's gotten him into trouble on several occasions, and that is, he's too enthusiastic about his work and overemphasizes its importance. He didn't get along very well with the people, primarily physicians, working in the field of glaucoma. He was not an ophthalmologist; he was a PhD, and he began to work on patients. The ophthalmologists shunned him a bit, and that hurt his feelings.

Hughes: *You mean because he was not an ophthalmologist?*

Maumenee: They felt unsure about his statements. So when the time came to decide upon his grants, they were on the committees, and they turned down his applications.

Hughes: *Was he working on aqueous flow?*

Maumenee: Yes, he did a lot of work on that subject. As a matter of fact, he wrote many papers on the beta and alpha adrenergic blockers well before Timoptic came along, and he thought they were very important. Unfortunately, he didn't find the one that really worked well.

Arthur M. Silverstein

Hughes: *And then there was Art Silverstein.*

Maumenee: Art is a very good immunologist and certainly the best immunologist in ophthalmology. He did some very good work with Ali Khodadoust, who later went to Shiraz, Iran, to run the eye department. Art also worked on producing uveitis in animals, and then did some other basic work, particularly on fetal animals, in removing the thymus and various other organs to see if he could prevent them from developing immunological competence.

Hughes: *Was that work connected with ophthalmology?*

Maumenee: Not particularly. It was basic science work in immunology. He removed the fetus from sheep, cut the thymus out, and then put the fetus back in the uterus and let it go to term. Or he might inoculate it while it was in utero and see if it developed immunity to that particular substance.

Hughes: *He talked about the immunologic privilege of the eye.* Had immunologists paid any particular attention to the eye?*

Maumenee: No. When I gave the dean's lecture,** I pointed out that because the cornea is avascular, you can do many things with it that wouldn't involve the blood vessels, and you could see what kind of reactions you could get. You could inject an antigen on one side of the cornea and an antibody on the other, and when the two would meet they would form an ortolani line, a white line of precipitate.***

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* Interview with Arthur M. Silverstein, PhD, May 15, 1990.

** Maumenee AE. The Dean's Lecture. The eye as a test-tube for the study of biological phenomena. Presented at The Johns Hopkins University School of Medicine, Baltimore, Md., February 6, 1978.

*** Parks JJ, Leibowitz HM, Maumenee AE. Immediate hypersensitivity reactions in the cornea of the guinea pig. *J Immunol* 1962; 89:323–25.
See also the many papers by Maumenee, Parks, and Leibowitz on immunology, usually in non-ophthalmic journals.

Hughes: *Which you could see microscopically?*

Maumenee: Grossly. With Howie Leibowitz and Jim Parks, we did a lot of work on injecting the cornea and checking out immediate hypersensitivity. See, there are two types of hypersensitivity. One is a humoral type caused by using horse serum or egg white or something like that, and the other type is a lymphocytic hypersensitivity which is called delayed hypersensitivity. We did a lot of work injecting the cornea and looking at the cells of the limbus to see what was going on. It was really basic immunology, and Art did a lot of work along those lines too.

Hughes: *Did he publish in immunological as well as in ophthalmological journals?*

Maumenee: Oh, yes.

Hughes: *Was he successful in getting immunologists interested in the eye?*

Maumenee: He was certainly asked to speak, and he started the immunological society here at Hopkins and attracted people from the basic science departments. I don't know that any of them really worked on the eye, but Art and Dr. Robert Prendergast worked on various things successfully. They tried to develop antibodies that would kill cancer cells.

I always felt basic scientists should do what they did best, and never tried to guide them. I told them that they didn't have to work on anything directly related to clinical ophthalmology. They could work on anything that was basic science, that sooner or later it would become important in learning the pathogenesis of diseases of the eye.

John E. Dowling

Maumenee: John Dowling was doing beautiful work on the organization of the retina. He felt that he was not contributing to the clinical aspects of ophthalmology, so he felt that he didn't belong here at Wilmer, that he should go to a neurosciences department. I tried to convince him that it really didn't make any difference to me whether he found something that was clinically important or not, as long he was discovering basic facts about the retina, that sooner or later they would become very important clinically.

Hughes: *He was working, to put it crudely, on the wiring of the retina?*

Maumenee: That's right.

Hughes: *Was he a pioneer in that area?*

Maumenee: Yes.

Hughes: *He worked at the microscopic level?*

Maumenee: Electron microscopic and microscopic.

Hughes: *You had an electron microscope in the institute?*

Maumenee: Yes.

Hughes: *He was here from 1966 to 1971 as an associate professor of ophthalmology and biophysics.*

Maumenee: Yes. When they looked for a successor to George Wald, who was a Nobel Prize winner at Harvard, they chose John Dowling, and he took the job. He's one of the best people in neurophysiology in the world today.

Hughes: *Why did he have a joint appointment in biophysics?*

Maumenee: Because he was working on the wiring of the retina. The eye is an outpouching of the brain. It's the only place you can actually see what's going on in the brain. That work is the reason [David] Hubel and [Torsten] Wiesel won the Nobel Prize. Steve Kuffler would have been included, but he died before the prize was given. I got John Dowling after Steve Kuffler left. Steve was so good that Harvard offered Steve, Dave Hubel, and Torsten Wiesel chairmanships of pharmacology and physiology.

When John Dowling left, Dave Robinson, who had a PhD in engineering, came on, and he began to take the brain apart. Using the extraocular muscles, he could show that the brain, if damaged, could rewire itself as long as the olive of the cerebellum was intact. I thought he was the first one to think of that. He told me just recently that someone else had thought of it, but he was the one who really exquisitely proved that this was true.

The New Outpatient Department

Hughes: *In either 1960 or '61—the date seems to be vague—a new outpatient department was built. Is there anything in particular to say about that?*

Maumenee: When I came, nothing had been done in the way of renovating the institute since it was built in 1927. The outpatient clinic had two rooms with a room in the middle. It was not a very good thing because you had to wait to use the slit lamp in a dark room on the side of each of these two rooms, and if you wanted to take a visual field you had to wait until somebody was not using the perimeter. So one of the first things I did when I came back from California was to remodel the basement clinic area into individual offices. Each office was fully equipped with slit lamp, perimeter, refraction equipment, and everything that was needed to examine the patient.

Hughes: *I read in the history of Wilmer that Dr. Woods was initially concerned that the new clinic with its separate rooms would be a detriment to resident teaching, that they wouldn't have the advantage of being able to freely consult or to look over somebody's shoulder.**

Maumenee: There were a couple of things I did that Dr. Woods disagreed with. One was that he thought that it was wrong to put the resident in a room by himself and let him examine the patient and not have somebody sitting nearby to consult with. The other was that the elevators didn't match the floors. The buildings didn't match exactly, and that's why you have to walk down steps between buildings. He wanted me to take out those elevators and put in new elevators, and I just didn't think it would work. He thought the library, which was just at the right of the front door, should stay where it was. I thought the ideal place was the basement of the new Woods Building because we had spare room and it was quiet.

The Alan C. Woods Research Building

Hughes: *The Woods Building opened in 1964. Was it the first building in ophthalmology totally devoted to research?*

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* Randolph ME, Welch RB. *The Wilmer Ophthalmological Institute: The First Fifty Years, 1925–1975.* Baltimore: Williams & Wilkins, 1976, p. 156.

Maumenee: It was the first building devoted solely to basic eye research, as far as I know. Prior to 1964, basic research had been done in the basement of the Wilmer Institute. It was very crowded down there, and it was obvious that to get good people in basic science we had to have something special to offer them. Either we had to offer them a lot higher pay—which they usually wouldn't come to Wilmer for, because more money didn't interest them if they couldn't do their work—or we had to give them better space and equipment. So I decided the best thing we could do was to build a research building, the Woods Building. We estimated the costs at $800,000 when we started. I think we finally ended up with close to $2 million for the building in '62.

Hughes: *Research to Prevent Blindness had a role in the funding.*

Maumenee: Yes.

Hughes: *You told me off tape that Milton Eisenhower, the president's brother, was helpful in raising funds.*

Maumenee: Yes.

Actually, the very first money we got came from a patient of Dr. Alan Woods who was with Texaco Oil Company. He gave $50,000. Then when we went to people to get money, we said, "That $50,000 is a starter. What will you give?" About the same time, Townley Paton, who I told you started the first eye bank and had been a resident here, knew Jules Stein's lawyer, Bob McCormick. McCormick came to Townley and he said, "Look, I have this client who is very wealthy; I think he's worth $500 million."

Jules Stein, interestingly enough, was an ophthalmologist. He went through medical school at Rush Medical School and then went into practice with Harry Gradle in Chicago. He made his way through school working with a band. He started the Music Corporation of America and went on to get practically every actor in Hollywood and every musician under contract with him. That's where he made all of his money.

Hughes: *Did he ever practice ophthalmology again?*

Maumenee: No, not after he left Harry Gradle. He passed his boards, and he wrote a paper on low vision, but that's as far as he went in ophthalmology.

I talked to Townley Paton and Bob McCormick on how one could get Jules interested in ophthalmology. We decided I would get twenty-five of the best ophthalmologists from around the country to meet in New York. I figured the best thing to ask Jules to do was to give us relatively small amounts of free money, because when you apply for a grant from NIH you've got to say exactly what you're going to do with the money and you can't do anything else. But he could give $5,000 a year to a department if it showed that it was capable of using the money properly.

Hughes: *For research?*

Maumenee: For research. Secondly, we told him we needed buildings for research space to attract good basic scientists and for assured professorships. Assured salary is what enticed John Dowling to come here. I had to make every effort to get his salary for him, but if I couldn't get it, Research to Prevent Blindness would provide it for three years. As soon as we got Jules interested, I asked for all three categories of funding [for salaries, additional research space, and unrestricted grants].

He put up $25,000 to hire a fundraiser, and the fundraiser told me, "I can't raise money for you. You have to go out and do it yourself. When I go to people, they're not going to give me any money. I'm a professional. I'll tell you how to present things to them and how to go about it." I couldn't get along with the first fundraiser he sent, so I fired him. The second person was really very nice and very cooperative and we got along fine, so I went to various people and began to get money. Certainly Milton Eisenhower, who was then president of Hopkins, was very helpful and encouraging.

Then we got funds from Alcon [Eye Research Foundation]. Bill Connor [Alcon's founder] was a friend of mine. He gave a floor. We went back to Kellogg [of the W. K. Kellogg Foundation], who had initially given money to Hopkins to do research on the cause of glaucoma. His foundation gave us a floor. The biggest surprise came from Dr. Angus MacLean, who had a patient who made Filbert's margarine. I explained to Mr. Filbert that we were putting up this research building, and he gave us a floor. With that donation, we topped what we were supposed to raise.

Research to Prevent Blindness helped build four or five other eye institutes. It then hired Mr. David Weeks, who became director. Jules left $20 million, and his wife, Doris, left $20 million, to Research to Prevent Blindness, so it's well

endowed. At one time there were three Nobel Prize winners on the scientific advisory board. I was the only ophthalmologist on the board for a while, and then Dr. David Cogan joined.

Hughes: *The scientific advisory board decided . . .*

Maumenee: . . . who should get the money for the grant proposals that were submitted. Then the recommendations from the scientific advisory board went to a lay executive board.

Louise L. Sloan

Hughes: *What about Dr. Louise Sloan and physiological optics?*

Maumenee: Sloanie was in the basement. I can't remember whether Wilmer or Woods brought her here.*

[Clarence] Ferree and [Gertrude] Rand were here [as heads of the Department of Physiological Optics], and they thought bacteria were going to get them, so they wouldn't touch anything, and they thought the whole place was contaminated all the time. They were very difficult. I don't know who finally fired them, Wilmer or Woods.**

Then we had a machinist, Mr. [Albert] Goebel, who had all the modern machinery. He could build anything we wanted in the way of equipment. He built a lot of equipment that Sloanie designed for physiological optics. She became known as a leader in physiological optics in America, if not the world, and was made an honorary member of the Academy.

Hughes: *What was her background?*

Maumenee: I really don't know.*** Sloanie was very smart and she wrote beautifully and did a superb job of research, but she was a poor lecturer. So her lectures weren't very well attended, and we didn't get very many people interested in physiological optics, in spite of the fact that she was really the world leader.

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* It must have been Dr. Wilmer because Dr. Sloan's association with the Wilmer Institute began in 1929. (Randolph and Welch, *The Wilmer Ophthalmological Institute,* p. 117.)

** Ferree and Rand were fired in 1934. Without more information, it is impossible to know who fired them, since Wilmer stepped down from, and Woods stepped up to, the chairmanship that year.

*** Her background is described in Randolph and Welch, *The Wilmer Ophthalmological Institute,* pp. 117–18.

Large-Scale Clinical Trials

Hughes: *Do you have any comments to make about the introduction of the large-scale clinical trial into medicine?*

Maumenee: I think in a way it's been way overplayed. There were a lot of things that were discovered and advances that have occurred before the advent of the large-scale clinical trial, particularly in cataract extraction and lens implantation. Even after we were doing a million lens implants a year in the United States, Carl Kupfer wanted to have a massive controlled study where we'd do an intracapsular cataract extraction on one eye and the extracapsular with a lens implant on the other. I think it's fine for a controlled study to be done on some problems, but you have to have some background in pathology of why your idea is right. You've got to then try it out on animals if that's appropriate—some things are appropriate and some are not, and some animals will react and some won't. Once you do that, then you have to have a pilot study on a relatively few patients to see if it's going to work. And if it doesn't work, why go into a multi-million dollar, clinical trial?

The first really big clinical trial in ophthalmology was the diabetic retinopathy photocoagulation study with the laser. But there were people who had already done the research and were convinced that the vessels in the retina disappeared when they burnt most of the retina off. So they wouldn't participate in the clinical trial. They said, "We're not going to subject our patients to this." If you know a procedure is good, I think it's not right to withhold it. On the other hand, there certainly have been mistakes in medicine where we thought a procedure or treatment was good, and it turned out to be not as good as we thought when we made a clinical trial. I think, particularly with drugs of questionable efficacy or toxicity, that the clinical trial is worthwhile.

When Simmons was head of the FDA [Food and Drug Administration], I knew him fairly well. He came to Hopkins and asked me, "Don't you think the FDA ought to be in charge of surgery? You surgeons are always modifying procedures, and you don't get any permission from anybody, you just go ahead and do it." I said, "I don't think you're going to ever be able to do that." I don't do a cataract extraction the same way twice in a month. I make innovations and minor modifications all the time. If I find that something's working much better than it worked before, I'm not going to go back

and ruin some eyes [using the old technique] just to prove that what I'm doing now is better. I'll do a series of cases and keep good records and then report those, and if the results are better than surgeons are getting elsewhere, they'll take up my technique. So I think clinical trials are good for some things but certainly not good for everything.

Informing Patients

Hughes: *Dr. Bettman mentioned that you changed the method of informing patients when you came to Stanford.* Apparently the old Viennese method was to protect the patient from unpleasant information. According to him, you believed in telling the patient what the actual situation was.*

Maumenee: That's right. I never told patients that they should have a cataract extraction. I would tell them what they had; I would tell them what the cataract extraction consisted of. I had a model eye, and I'd show them how the lens was removed. Then I would explain the complications that could occur. They could get an infection or hemorrhage and lose the eye. They could die from the local anesthetic. If they insisted on having general anesthesia, they could die from it, too. A lot of these complications were very, very rare, or we wouldn't have been doing as many cataracts as we were doing. These were complications that the surgeon couldn't help. No surgeon can operate and not have complications. If he doesn't, he isn't operating. You're going to have complications, I don't care how good you are. Even if you're taking out ingrown toenails, somebody's going to get gangrene or something.

Hughes: *Did you require some form of written consent?*

Maumenee: No.

Hughes: *When were consent forms introduced at Hopkins?*

Maumenee: I don't remember because my fellows and my residents always got them signed.

* Interview with Jerome W. Bettman Sr., MD, May 2, 1990.

Glaucoma

History of Surgical Techniques

Hughes: *Could you tell me about the evolution of operative techniques for glaucoma?*

Maumenee: There were a number of techniques for operating on glaucoma, starting in the 1800s with [Albrecht] von Graefe, who did an iridectomy in a patient who happened to have angle-closure glaucoma. Otto Barkan was one of the first people who used the gonioscope to differentiate between angle-closure glaucoma and open-angle glaucoma. Of course, there were all sorts of people, once gonioscopy got under way, who used it and probably get more credit than Otto Barkan.

Von Graefe didn't know the difference between angle-closure glaucoma and open-angle glaucoma when he did an iridectomy. With angle-closure glaucoma, you get a relative pupillary block. The iris slides up on the lens, and as it slides up, the iris presses more on the lens. People with shallow anterior chambers have a greater chance of getting angle-closure glaucoma, because the iris bulges up in the periphery and closes off the angle, and the intraocular pressure goes up very rapidly and very high. Von Graefe's iridectomy cured that. So that became the operation for all types of glaucoma.

Iridectomy doesn't work in a lot of patients, because only about 5 percent or 10 percent of glaucoma patients have angle-closure glaucoma. Most are cases of open-angle glaucoma. An open-angle glaucoma is more like water running into the sink, and because of grease in the pipe, the water finally overflows the sink. The eye's a closed circuit so the aqueous can't get out, so it pushes on the optic nerve and causes cupping of the optic nerve and pinching of the axonal fibers. This blocks the axoplasmic flow which causes loss of ganglion cells, but nobody really knows why. They think it's because there's not a feedback through the retrograde flow of axoplasm, but that's just a guess.

Then [Robert Henry] Elliot came along with a trephine. He would pull down a conjunctival flap and trephine a little hole into the eye and pull the flap back, and then the fluid would flow out under and through the conjunctiva. I don't know who invented the iridenocleisis, but the surgeon would make an opening in the sclera and pull out two parts of the iris under the conjunctiva, and the incarcerated iris would keep the wound open until you got a good flow of aqueous. The

iridenocleisis worked pretty well. But a sufficient number of people with iridenocleisis got sympathetic ophthalmia with that operation. It went out of style and was pretty much discarded.

Hughes: *Did you ever do it?*

Maumenee: Yes, I did a lot of them. It was an easy operation, and when it worked, it worked beautifully. But I remember one of Dr. Alan Woods's patients got sympathetic ophthalmia when I was helping him.

Hughes: *Was that because there was an external opening?*

Maumenee: Yes, there was iris sticking out. In all these years, we've never found out why some people get sympathetic ophthalmia when they get laceration of the iris and other people don't. We were primarily doing trephines, and then somebody figured out it was easier to make an opening in the sclera by punching out a piece of sclera.

Hughes: *Did you ever use goniopuncture?*

Maumenee: I never thought goniopuncture really worked. I know Hank Scheie thought it was good, but nobody else thought so.* Nobody got the same good results that he did.

Hughes: *Because the hole plugged up?*

Maumenee: Yes. It wasn't a big enough hole. See, the mistaken idea that people had was that the sclera healed and closed off the wound. I wrote a paper for the AOS [American Ophthalmological Society] in which I pointed out that that was practically never the case.** The subconjunctival Tenon's capsule becomes fibrotic, forming a watertight membrane. You could form a bleb four millimeters in height and width. So you had two anterior chambers, and the patients could have a tension of forty. You could then inject fluid between the two layers of Tenon's capsule and conjunctiva and, with a knife, slice into the posterior part, and the tension would drop to zero right away and filtration would occur. If you put

* For Dr. Scheie's views on goniopuncture, see *Harold Glendon Scheie, MD.* Ophthalmology Oral History Series, A Link with Our Past. Interview conducted by Sally Smith Hughes. The Foundation of the American Academy of Ophthalmology, San Francisco, and The Regional Oral History Office, University of California at Berkeley, 1988, pp. 236–39.

** Maumenee AE. External filtering operations for glaucoma: the mechanism of function and failure. *Trans Am Ophthalmol Soc* 1960; 58:319–28.

fluorescein on the outside of the eye and pressed on the eye, you could see the aqueous flow through the conjunctiva.

[Peter C.] Kronfeld in Chicago, who was head of the Illinois Eye and Ear Infirmary, did a lot of fancy work looking at the ascorbic acid in the tears. Since the tears had such a high ascorbic acid, he could show that it was a functioning bleb because the aqueous had a high concentration of ascorbic acid. So he felt that filtration through the conjunctiva was the main way gonio worked. It's taken generations to get that idea across. People still thought until just recently that the major problem was the closure of the sclera. But I did enough reoperations to see that there was a very thin layer of fibroblasts over the sclera and the scleral opening. I'd cauterize those few cells and all the aqueous would immediately flow out.

Failure in Filtration Surgery

Hughes: *Marvin Sears wrote me a letter from which I would like to quote: "Dr. Maumenee consistently and repeatedly pointed out the main cause for failure in filtration surgery in glaucoma, a point which . . . was not picked up for years after his initial studies and description of these important conditions."**

Maumenee: That is referring to the paper I wrote for the *Transactions of the American Ophthalmological Society* which describes the causes of the failure of glaucoma filtering blebs.** I was interested in why glaucoma filtering operations failed to work, and I pointed out that it was due to a fibrosis of the subconjunctival tissue. Everybody else thought that the sclera healed over the opening and that was a cause of the failure of the operation.

They have now found that fibrosis of the subconjunctival tissue is the primary cause of failure of glaucoma filtering operations, and this can be blocked to some extent by using 5-FU, which inhibits the development of fibroblasts. They have shown when they use 5-FU they can get a much higher success rate of glaucoma filtering operations. They now have a new product that is more powerful than 5-FU. They are getting a fantastic number of excellent filtering blebs because they are blocking fibroblastic proliferation.

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* Marvin L. Sears, MD, to Sally S. Hughes, PhD, October 26, 1989.

** Maumenee AE. External filtering operations for glaucoma: the mechanism of function and failure. *Trans Am Ophthalmol Soc* 1960; 58:319–28.

Hughes: *How does this work?*

Maumenee: The surgeon made a hole in the sclera, but the subconjunctival tissue would come down and seal it off. For instance, I operated one day on a young lady who had glaucoma. She came back that night and had a big bleb in the area of operation and her pressure was thirty-five. I looked at her under the slit lamp, and there was one anterior chamber under the bleb and another anterior chamber in its normal position. I turned her upside down because there was an air bubble pushing up Tenon's capsule and the conjunctiva. As soon as I did, the air bubble went into her anterior chamber, the compactness of the tissue disappeared, and the pressure fell to fifteen.

I had a group of patients who had had glaucoma filtering operations which had failed. I had to do cataract extractions on them. When I went back in [surgically], I found that the hole in the sclera never heals. The sclera never seals, except in a Scheie operation which creates a slit which is so narrow that it closes up.* Every case I looked into, I could balloon up the conjunctiva, and it would be perfectly all right but there would be a thin membrane over the hole. As soon as I cut through that membrane the aqueous would flow out.

Harold G. Scheie

Hughes: *Speaking of Scheie, since he did so much glaucoma work, was there communication between you two?*

Maumenee: We had a lot of arguments. Hank was a superb surgeon and a very smart guy, very, very positive, very domineering, and he really ran everything. He built the Scheie Eye Institute in Philadelphia.

I will never forget. I was arguing with Hank about congenital glaucoma, and I said, "Hank, how do you know that's true?" His answer was, "I know it's true because I say it's true." [laughter]

Hughes: *I know you operated a lot on congenital glaucoma, which was also one of his specialties. Did you differ on how to treat it?*

Maumenee: Yes. Completely.

* For a discussion of the Scheie procedure, see the oral history in this series with Dr. Scheie, pp. 240–43.

He claimed that he could make [gonio]punctures which cured all his patients. I would make the same kind of punctures and have every one of them seal over. They just didn't work. He claimed he was getting great results. I don't know what else he was doing. Maybe he was doing a goniotomy and cutting the longitudinal muscle away from the trabecular meshwork which allowed the longitudinal muscle to go back and work. I still don't know how a goniotomy works and nobody else does either.

That was one thing we disagreed on. There were several other things. I really had great respect for Hank, and his wife was delightful. He was a superb surgeon. There is no question about it. He did a tremendous amount of surgery. But he didn't know anything about pathology, and that was probably my greatest asset.

Recessed-Angle Glaucoma

Hughes: *Dr. Sears also wrote that "he," meaning you, "was the true discoverer of recessed angle glaucoma, a condition which he diagnosed on ward rounds and told what he believed the cause was[,] and allowed his colleagues and students to get the credit."* *

Maumenee: That's right. The iris in an infant comes right off the scleral spur. As you get older, and particularly in a nearsighted person, the iris recedes so that there's a good area of sclera between the iris and the scleral spur, and the trabecular meshwork goes from the scleral spur to Schwalbe's line.

We had a young black boy who had been hit in the eye and developed an angle recession. The angle was receded well back, so I thought that was the cause of his glaucoma. I made a comment on rounds about this case and said that I thought that the longitudinal muscle had been stripped off the scleral spur so that it wouldn't pull the iris open, and that that was probably the cause of the glaucoma. I don't know 100 percent whether that's right or wrong. Very frequently, people get angle recession and won't get glaucoma for twenty years. But we did discover that condition in this patient. Then Stewart Wolff, who was a resident at the time, looked at some slides of the eyes of glaucoma patients who had undergone trauma to the eye, and saw that the angle had been recessed, and wrote the paper on it.** Marvin's got a good memory.

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* Marvin L. Sears, MD, to Sally S. Hughes, PhD, October 26, 1989.

** Wolff SM, Zimmerman LE. Chronic secondary glaucoma. *Am J Ophthalmol* 1962; 54:547–63.

Tonography

Hughes: *What about tonography, which I understand was Bernie Becker's special interest?*

Maumenee: Right. I didn't have much to do with tonography. I think Morton Grant at the Massachusetts Eye and Ear was the first person to describe this technique.* It consisted of putting a weight on the eye, leaving it there for a certain period of time, taking the weight off, and seeing how much fluid had been pushed out of the eye. If the patient had glaucoma, a graph of fluid outflow would remain flat; there wouldn't be any change in the pressure. The increased pressure didn't cause an outflow. But tonography has so many problems that I don't think anybody uses it anymore.

Hughes: *That was certainly Dr. Scheie's opinion when I talked with him.** He was an early opponent of tonography because, for one thing, he couldn't get reproducible results. He said it was difficult to get a paper on glaucoma published during a certain period without tonographic . . .*

Maumenee: . . . proofs.

Hughes: *Was that your experience?*

Maumenee: I didn't really think much of it, so I seldom did it.

Hughes: *Why?*

Maumenee: I couldn't get a consistent finding. I'd get one reading one day and a different one on the next.

Hughes: *That's what Dr. Scheie said.*

Maumenee: It required a complicated mathematical formula. The patients who had low outflow sometimes wouldn't have any other evidence of glaucoma, and those patients that would have good outflow would have evidence of glaucoma.

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* For more on tonography, see the oral history in this series with Dr. David Cogan, pp. 50, 63.

** Scheie oral history, pp. 247–49.

Hypotony

Hughes: *I'd like to discuss a paper on hypotony which you published in 1961 with Paul Chandler.**

Maumenee: It's an interesting story. I had noticed that if you did a cyclodialysis—that is, if you broke the adhesion between the scleral spur and the muscle—fluid would get in under the ciliary body, and the patients would develop hypotony. Surgeons felt for some reason that they had to do basal iridectomies in cataract extractions. When they did, they would tear the iris off the ciliary body and they would produce a small cyclodialysis.

While I was drinking a pitcher of martinis with Paul Chandler in Madrid one night and we were talking about glaucoma, I told him about this problem. He said, "Ed, you're right. I've seen that too." So then I went back and looked at the pathology of the patients who had hypotony, very low pressure, people who had had their eyes removed for some reason. They all had a serous detachment of the ciliary body.

I made a hole 180 degrees away from the area of the cyclodialysis hole and drained all the fluid from the ciliary body. I put fluorescein in the anterior chamber and showed that fluorescein was flowing out through the hole between the ciliary body and sclera. When I made the hole 180 degrees away, fluorescein came out. When I sealed off the space between the ciliary body and sclera where the cyclodialysis hole was, the pressure would go up that night to sixty or seventy. It cured the hypotony, so I got patients referred to me from all over the country who had developed hypotony after cataract extractions.

My idea came about through Jack Guyton, who is very interested in cyclodialysis for the treatment of glaucoma. He operated on both eyes of one of the key people in the Ford Motor Company. Every time he let the pupil contract, one eye would go into hypotony and the patient couldn't see. Jack dilated the pupil with atropine to close off the opening, and the pressure went up. That's why I got the idea that the cyclodialysis cleft was causing the hypotony. I still have no idea why a fluid over the ciliary body keeps it from secreting. But it is a very delicate mechanism.

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* Chandler PA, Maumenee AE. A major cause of hypotony. *Trans Am Acad Ophthalmol Otolaryngol* 1961; 65:563–75.

Paul Chandler and I wrote the paper, and since Paul was my senior, I let him put his name first, but he never looked at any pathology.

Otto Barkan and Congenital Glaucoma

Hughes: *Dr. Maumenee, when I talked with Dr. Harry Quigley, he told me that the belief in ophthalmology used to be that glaucoma was a disease of poor blood vessels, that the elevated pressure hurt the blood supply to the optic nerve.* You apparently did not agree with that theory.*

Maumenee: Let me go back a little further. When I first went to Stanford, Otto Barkan was the world authority on congenital glaucoma. He was very nice to me. We played golf together. He operated in secrecy and wouldn't let anyone see him, but he let me come in and watch him operate.

Hughes: *Why was he secretive?*

Maumenee: He was a peculiar person. He and his brother Hans Barkan got into some kind of argument, and for some twenty years they wouldn't speak to each other. Otto Barkan was a brilliant guy. He was one of the first people who did gonioscopy and described shallow-chamber glaucoma. He looked at children with glaucoma, and he thought he saw a membrane over the trabecular meshwork. He never looked at any children with strabismus or normal children that were being examined for other reasons. All children have a shagreen over the trabecular meshwork.

So I went back and got the pathology on some twenty-four eyes of children who had congenital glaucoma. It was during the time of the rubella epidemic, where the mother had rubella and the children had glaucoma. It was probably related. The children had died on the operating table because they had heart troubles. When I looked at these eyes, there was no membrane there, so I told Otto he was wrong. He totally prohibited me from ever coming to his operating room again. We had a symposium on congenital glaucoma that Al Reese asked me to organize. Otto Barkan refused to be on the program with me because I had disagreed with him. So I got Bob Shaffer to give my paper for me. Bob gave me credit for it because I had all the pathology.

* Interview with Harry A. Quigley, MD, May 14, 1990.

I found that in doing an iridectomy, blood got into the anterior chamber. Red blood cells got through the trabecular meshwork, so there couldn't be any membrane there.

Hughes: *Had Barkan actually looked at the pathology?*

Maumenee: He never looked at any glaucoma pathology. He only looked clinically with a gonioscope. He could see this membrane and I could see it too. The shagreen was present in all children.

I always took December off to do the written work I had to do. To prepare my AOS thesis,* I went back and looked at slides of congenital glaucoma cases. Much to my surprise, the longitudinal muscle of the ciliary body had bypassed the scleral spur. In the angle of the anterior chamber, you have the scleral spur, which is a piece of sclera. The trabecular meshwork hooks anteriorly onto Schwalbe's line and posteriorly to the scleral spur. When this spur is pulled back by contraction of the longitudinal muscle of the ciliary body, it opens all the pores of the transscleral meshwork so that the aqueous can flow out. In the same way, when you give pilocarpine, you open up the angle so that the fluid can get out. What I found in congenital glaucoma was a longitudinal muscle which in embryonic life was normally ahead of the scleral spur but which did not recede as it should. It stayed forward.

Hughes: *So it was a mechanical blockage.*

Maumenee: Yes.

I had written my AOS thesis on the basis of this work [but not yet turned it in]. Just before Christmas [1957], I looked at the tissue sections again, and I noticed that the longitudinal muscle bypassed the scleral spur, and I had to rewrite the whole paper and turn it in. That has become the generally accepted concept of the pathogenesis of congenital glaucoma.

Theories on Loss of Visual Field

Maumenee: You asked about the theory that elevated pressure in glaucoma decreases the blood supply to the optic nerve. [S.S.] Hayreh, who worked with Norman Ashton in England, wrote a ton of articles, and so did Duke-Elder, saying that the loss of visual field was due to an ischemia of the optic nerve. I thought the vascular theory of the loss of visual field was

* Maumenee AE. The pathogenesis of congenital glaucoma: a new theory. *Trans Am Ophthalmol Soc* 1958; 56:507–70. Also in: *Am J Ophthalmol* 1959; 47:827–58.

wrong, because my patients who had shock or whatnot did not get loss of visual field. There were many other things that pointed to the fact that it was not due to a vascular abnormality. No one had really studied the lamina cribrosa. That's the outlet where the optic nerve goes through the sclera and then on to the brain. F. Vrabek did silver stains of the nerve and showed that the blockage of the axonal fibers occurred right at the lamina cribrosa.* A resident, Mark Lieberman, and I got a number of eye bank eyes, and we serially sectioned them and showed that the lamina cribrosa was fed by vessels that went straight from the short posterior ciliary arteries into the lamina cribrosa.

Hayreh, using [Paul] Henkind's studies of the choroid, felt that the vasculature to the lamina cribrosa came from the choroid. When we studied it, there were only a few tiny vessels coming from the choroid; 99 percent of them came from outside of the choroid.

So all this made me think that the vascular theory was totally false. I sent Harry Quigley down to Doug Anderson, whom I considered one of the leading experimental pathologists in the country. Doug somehow or other was totally convinced the loss of visual field in glaucoma was vascular. So Harry came back with the idea that it was vascular. I said, "Harry, you have got to look into this. It's *not* vascular." Strictly on the basis of what I'd observed clinically and what I'd read in Steven Drance's and others' papers, the relationship between loss of blood and loss of visual field is very vague.

Harry did some absolutely gorgeous work and showed that the lamina cribrosa was made up of eleven layers of collagen fibers. I had observed that there were pits that occurred in the lamina cribrosa.** These pits exactly corresponded to the areas of visual field loss. So something was happening to the lamina cribrosa which made it give way in these areas.

Harry did superb studies counting the axonal fibers in patients with glaucoma. He showed that there was a diffuse loss of ganglion cells, but there was a loss primarily along the arcuate scotomas. He then used substances that had the same permeability as oxygen and showed that there was no

* Vrabek F. Glaucomatous capping of the optic disk; a neurohistologic study. *Arch Ophthalmol* 1976; 198:223–34.

** Radius RL, Maumenee AE, Green WR. Pit-like changes of the optic nerve head in open-angle glaucoma. *Br J Ophthalmol* 1978; 62:389–93.

loss of oxygen to the lamina cribrosa. [Donald S.] Minckler had done some very good work on axoplasmic flow.*

In about 1970, I went to all the physiologists that I knew and asked how I could prove the loss of visual field to be mechanical. Keffer Hartline referred me to a fellow named Paul Weiss who was at the Rockefeller Institute. Weiss had found that during World War II, when people had their peripheral nerves cut, if he put a vascular cuff over the ends of them so that fibroblasts couldn't grow in, the nerves would regenerate and be perfectly all right. But if the vascular cuff was too tight, it would cause a bulge between the ganglion cell and the point where the blockage occurred.** This showed, in contrast to what people believed before, that the nerve fibers acted only like electric wires, that there was an active, living, axoplasmic flow.

So I wrote to Weiss and he wrote back and said, "From what you're telling me, I think you are probably entirely right that this is a mechanical blockage and not a vascular blockage. A vascular blockage will occur and will stop the axoplasmic flow if the blood vessels are knocked out."

I looked at the pathology, and even in the most advanced cupping [of the optic disc] I could find good blood vessels all through the lamina cribrosa. Harry has convinced the rest of the world, in a series of excellent studies in animals and cadaver eyes of patients who had glaucoma, that it is not ischemia that causes glaucoma's field loss.

Hughes: *What is it?*

Maumenee: It's like putting your fingers into a Chinese puzzle. If you pull hard enough, the puzzle gets tighter and tighter and you can't get your fingers out. Well, these fibers are arranged in ten layers, one on top of another. They have holes which the axonal fibers go down through. When the pressure goes up, depending on the strength of your connective tissue, these layers give, and when they slide, they pinch the axons and cut off the flow of axoplasm. Harry confirmed that there was an orthograde flow from the ganglion cells back to the optic nerve head, and the blockage occurred right at the lamina cribrosa. He also showed that there was a retrograde flow coming from the end organ that flowed back in the other direction and was blocked right at the lamina cribrosa.

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* Minckler DS. Optic nerve in glaucoma. Obstruction to axoplasmic flow. *Surv Ophthalmol* 1981; 26:128–36.

** Weiss PA. 'Panta Rhei' and so flow our nerves. *Proc Philosoph Soc* 1969; 113:140.

Hughes: *So the evidence was convincing, wasn't it?*

Maumenee: Yes, it was convincing. The blockage had to be at the lamina cribrosa. Since the blood vessels didn't change in the lamina cribrosa in eyes with glaucoma, then the blockage had to be mechanical. I think we now have convinced many ophthalmologists around the world that the mechanical theory is a factor in visual field loss in glaucoma.

Hughes: *There is a tendency in science to hang onto an old theory well after it should be discarded. Do you think there was a certain amount of that going on?*

Maumenee: Yes. Some of the older pathologists had pointed out that it was probably the change in the structure of the lamina cribrosa that caused visual field loss. But this hypothesis was forgotten because Duke-Elder said that glaucoma was a systemic disease of the smaller blood vessels.

I presented the mechanical theory in the Shaffer lecture and summarized all the clinical evidence that I had, but it was Harry Quigley who did the pathology.* People believed Harry, and Harry became the world's greatest authority on the loss of visual field in glaucoma.

Low-Tension Glaucoma

Hughes: *Does that information have clinical implications?*

Maumenee: Oh yes. We have people with low-tension glaucoma whose intraocular pressure never seems to go up. When I put them on home tonometry, I said, "Your blood pressure is not the same all day long and neither is your eye pressure. A doctor takes your pressure for about two seconds. The rest of the day, the rest of the month, the rest of the three months before you come in again, you don't know what it is." So I sent people home with a Schiötz tonometer, which became discredited because it had to do with scleral rigidity, ocular rigidity, and the reading would be quite false. [Hans] Goldmann developed an applanation tonometer which became the standard because it pressed on the cornea and flattened it out to a certain degree, giving you a much better gauge of what the pressure was in the eye. It still has defects, but it is much better than the Schiötz.

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* Maumenee AE. The Robert N. Shaffer Lecture. Causes of optic nerve damage in glaucoma. *Ophthalmology* 1983; 90:741–52.

If I took a Schiötz tonometer reading of the pressure in the eye and then checked it again with an applanation tonometer, I would get a constant difference in reading. So I sent the patient home with a Schiötz tonometer. Using this constant difference, I could calculate what the pressure was.* They would bring in beautiful daily charts and say, "Two cups of coffee, and the pressure went up like this. I had four martinis, and my pressure fell like this." For a week the pressure would be perfectly normal. Then all of a sudden the pressure would spike to thirty or thirty-five millimeters of mercury. The lamina cribrosa in those people was weak.

I happened to have one patient who had been diagnosed at Duke, at Columbia, and at other places. They all told her that she had ischemia of the optic nerve. Her sister was also told she had the same ischemia of the optic nerve because the ophthalmologists never found the pressure up. Well, I gave her two pints of water to drink, and dilated her pupils, and did everything to push her pressure up, and it went up to thirty-five. Then I took her pressure from time to time, and on rare occasions and on home tonometry, her pressure would go up. The lamina cribrosa, just like all your other tissues, has different strengths in different people. You have people with weak lamina cribrosas who can't even stand a pressure of nineteen.

I had another patient who was about five four and weighed two hundred and fifty pounds and had high blood pressure. I followed her for twenty-five years. I operated on her I don't know how many times, to bring her pressure down. I could never get it down. But she never went blind. She wouldn't let me take a good visual field, so I didn't know how it was doing. She saw until she died. Because I had been so close to her, she left her eyes to be examined, and we put them in glutaraldehyde right away. She had a big, thick, trabecular meshwork. It was very strong. Two weeks later another woman, whose soft glaucoma I had been following, died and left me her eyes. Her lamina cribrosa was composed of very thin connective tissue fibers. It didn't have any strength.

Acceptance of the mechanical theory is one of the things I enjoy so much because almost everybody believed in the vascular theory as a cause of loss of visual field in glaucoma. I finally got my way, through Harry Quigley's brilliance and excellent basic research.

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* Jensen AD, Maumenee AE. Home tonometry. *Am J Ophthalmol* 1973; 76:929–32.

Hughes: *I've noticed that you like the challenge of trying to convince the world that you are right.*

Maumenee: I was fortunate to be a general ophthalmologist. I did everything. My main fun in life was to give residents a project and get them to do all the work, and then I would get credit for it. [laughter] But it made them realize that they could do something.

As Mort Goldberg said, "In my residency, you always pushed me beyond anything I thought I could do. You were so positive that it really made me achieve. I didn't think I could do all these things. You were always on me, making me do them."

Hughes: *So the residents were trying their darnedest to live up to your expectations.*

Maumenee: That's right. That's the way I had fun. Doing all the administrative work and everything else, I got to the point where I just didn't have time to go to the laboratory myself.

Hughes: *When it came to publication, where did you put your name?*

Maumenee: On most of my papers, my name is last or well down the line.

Hughes: *That isn't the way it used to be done, particularly in Europe.*

Maumenee: Yes.

The Resident Training Program

Encouraging Residents to Enter Academic Medicine

[Interview 4: May 18, 1990, Wilmer Ophthalmological Institute, Baltimore, Maryland]

Hughes: *Do you like to teach?*

Maumenee: I enjoy it. I think one of the greatest pleasures I've had in ophthalmology is to teach some very bright young people and then see them go to the top of ophthalmology. It's like having your own children succeed. So many of the residents say, "You've been like a father to me. You've taught me more than

anybody's ever taught me." It's just great. It's just such a pleasure to hear that.

Hughes: *Were you conscious of being a role model?*

Maumenee: Several of the ex-residents who became chairmen have said that they tried to run their departments the way I ran mine.

Hughes: *How would you describe your teaching style?*

Maumenee: I told them what to do, and I showed them where they made mistakes and where they did well. I tried to compliment them and give them confidence in themselves. I made suggestions about the type of research or writing they could be doing. If they were particularly good, then I tried to convince them that the best place in the world for them was in academic ophthalmology where they'd have the freedom and time to carry out their ideas. If they were not good, I told them to go into private practice.

Hughes: *Have you been successful in convincing people to go into academic ophthalmology?*

Maumenee: As I mentioned to you before, I think at one time I had seventeen chairmen of departments in other medical schools, which is a record; no one else in the history of ophthalmology has ever trained as many. Then there have been equally that many or more who have become full-time faculty members, but who don't want the responsibility of being chairman. Don Gass, Lawton Smith, and some of the other very capable people I've had like to do their own thing.

Hughes: *Dr. Miller told me that in the seventies there was an amazing group of residents, he being one of them. He named people such as Al Sommer and Harry Quigley.**

Maumenee: David Guyton. Walter Stark. Ron Michels.

Hughes: *He said that you encouraged them to stay at Wilmer, which seems to me a slightly different pattern. As you said, you had previously been encouraging your best residents to become department chairmen. Why at that particular time were you trying to keep people at Hopkins?*

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* Interview with Neil R. Miller, MD, May 16, 1990.

Maumenee: I think a couple of things happened. Ken Kenyon helped recruit a lot of those people from medical school. He knew them and got them to come to Wilmer.

The other thing was, before, when I tried to keep people here, they would get offers from other medical schools at three times the salary Hopkins was allowing me to offer. It was such a marked difference, they wouldn't stay. This group came along, and we had places for them, and they all had subspecialties which fit right into the program. So I coaxed them to stay on here. We were making enough money that I could pay them salaries equal to what they could get anywhere else, and more than many places. Most of them have stayed on, even though every one of them has been offered chairmanships in other places. I think Ron Michels is one of the few that left.

Selecting Residents

Hughes: *Please comment on selecting residents.*

Maumenee: I think the most important thing in the resident training program is the selection of the resident. That's very difficult to do when you have a half-hour interview with someone who's spent most of his life becoming a doctor. First of all, I look for people from the better medical schools because the better medical schools get the better students.

Hughes: *Would you consider somebody from a lesser medical school?*

Maumenee: Yes. Some of the best residents I've trained have come from smaller medical schools. After all, I came from the University of Alabama.

Hughes: *[laughs] That's true.*

Maumenee: The first thing I did was look at residents' standing in medical school. If they were in the top of the class in medical school, then I was very interested in them, particularly if they had done research applicable to problems in the eye but outside the field of ophthalmology, or even if the research was not applicable to problems in the eye. It showed that they knew how to do laboratory research. So if I had two applicants from equal medical schools with equal grades, and one had done some good research and the other had just been a book-study person, I would take the person who had done research.

Hughes: *And the reason you did that?*

Maumenee: I wanted my residents to go into academic medicine. I thought that Wilmer was one place where we had the facilities to train residents to be chairmen of departments or very good academic medicine persons.

Hughes: *So you felt that if a person wanted to be a general practicing ophthalmologist, there were other institutions that could provide that training?*

Maumenee: That's right. I frequently told some of the really top students, when I asked them what they wanted to do and they said they thought they would like to do a little academic teaching and go into practice with their father, that there were a number of places where they could learn good ophthalmology, and I thought those departments were better for them than Wilmer. I was much more interested in people who wanted to go into academic ophthalmology.

Hughes: *Were you disappointed when your residents chose practice as opposed to academia?*

Maumenee: Well, a little. A few of the people that I thought would have been good academicians didn't go into academia. I convinced almost all of those that I really felt would make good academics to go into academic medicine, and they're delighted with it. They wouldn't give it up for anything. They are people who have imagination, who really enjoy doing new things.

The second thing I looked for in choosing residents was the ability to think independently, to come up with new ideas, new concepts, new ways of doing things.

Hughes: *You determined that through conversation?*

Maumenee: Yes.

I remember when I was a second-year resident, one of the leading ophthalmologists from Birmingham, Alabama, Dr. Brownley, came up to the Wilmer residents' meeting. Vitamins were the big thing at that time, and they were supposed to do all kinds of great things for the patient. I gave a talk on vitamins, and he came up afterwards and spent half an hour or so asking me all about vitamins. He didn't even know what the new vitamins were, and I thought, my gosh, if one of the leading ophthalmologists in Birmingham doesn't

know any more than that, I don't want to go into practice and become that far behind the leading things in medicine. I had the nerve to tell somebody when I was a second- or third-year resident that I wanted to be the best ophthalmologist in the world. So I just couldn't see myself going into private practice.

As the residents came along, if they seemed to have some ability to do something new, either clinically or in the laboratory, then I tried very hard to get them to go into academic medicine and to find them a position. We would pick five residents for the residency training program. There were four when I first came back to Hopkins in 1955, and then we went to five so we could give them more time to do research. It didn't turn out that way; they filled up the year with other things and didn't do any more research work than they did before.

Program Structure

Maumenee: The first year was strictly a learning period. They worked primarily in the clinic, seeing all the clinic patients. They did all the night work, they did all the inpatient workups, and they did all the scut work, so to speak—the things that weren't particularly exciting. Practically every resident said they learned more in that first year than they'd ever learned in their whole training in school.

Most medical schools do a very poor job of teaching ophthalmology because they assign the ophthalmology faculty such a short period of time to be with medical students. It's primarily lectures. The terminology in ophthalmology is foreign to them. Unless we get them to work in the lab and spend their free time with us, they really don't get to know ophthalmology until their first year of residency.

We have a great referral practice at Wilmer, so we see a lot of pathology. We emphasize that we are a referral center, a tertiary center, not a refraction center. We do refractions, of course—that keeps the place going. The doctors in private practice didn't want to waste their time, so they would send all their difficult cases to us. It was great because we had just the best pathology in the world in the clinic. It's gotten worse now because these patients can either get their eye care paid through the government or they have insurance. The clinic is not a nice place, so they go to a private doctor instead.

First-year residents assist in the operating room. They fix lacerations and other injuries at night in the accident room.

If it's an intraocular operation, the assistant resident is called at night, and he does the operation and the first-year residents help.

In the second year, they begin to operate. They rotate through pathology, they rotate through neuro-ophthalmology, they rotate through strabismus, they rotate through all of the various subspecialties. During that time they have a period in which they call themselves "the resident." It's a three-month period in which they do most of the surgery. There's some done by other residents, but they get the majority of the surgery that's not done by the senior resident.

In the third year, they go to Baltimore City Hospital, now called the Francis Scott Key Hospital, and also they go to the old marine hospital, now called Wyman Park Hospital, which is a government-run hospital. Wyman Park gets a fair number of patients who are veterans and merchant marines. We have a senior resident or one of the staff members go over in a supervisory position.

Hughes: *Are the types of cases different from Wilmer's?*

Maumenee: A little. They don't get as many referrals of tough cases, but they've got enough cataracts and glaucoma and other routine cases that the residents get good experience.

Hughes: *Do your residents do a lot of operating?*

Maumenee: I'd say that the average resident will end up doing 150 to 200 operations.

Hughes: *How does that compare to other programs?*

Maumenee: About medium, I'd say. There are hospitals that concentrate primarily on clinical work and not research, like Wills Eye Hospital.* I think they take something like thirty residents a year. They have a vast volume of patients coming in. The former Wills residents refer all their cases to Wills, so it's a much bigger volume of clinic patients than we have. I'd say we're in the middle group in regard to the number of patients we see. In percentage of pathology, we're very, very high. But the number of patients is relatively low, and we don't want a great volume of patients. We don't want to do a lot of

* For information on Wills Eye Hospital, see *Thomas David Duane, MD.* Ophthalmology Oral History Series, A Link with Our Past. Interview conducted by Sally Smith Hughes. The Foundation of the American Academy of Ophthalmology, San Francisco, and The Regional Oral History Office, University of California at Berkeley, 1989, pp. 85–93.

refractions. We have to do some, because we've got to learn how to refract. The joke is that the Wilmer residents never learn how to refract; they only know how to use a pinhole. [laughter]

Then the third-year residents come back to Wilmer, and they supervise the first- and second-year house officers. The fourth-year residents go away for a year and take a special fellowship in lab research in a clinical specialty. There are some residency programs that let the fellows that come from outside do most of the operations. The house officers there don't like it because it takes operations away from them.

Hughes: *Do you leave the decision about where to go up to the resident?*

Maumenee: Absolutely.

Hughes: *Does it require a recommendation on your part?*

Maumenee: Yes. Usually in their three years of training, they've gone through all the subspecialties, and they pick out one that they particularly like. I recommend a subspecialty to each resident: one may be a very skilled surgeon; another may be a good clinician and handle patients very well; another may be an outstanding research person. One resident, who has just finished his residency of three years, has written twelve books on computers. Two were on the *New York Times* nonfiction best-seller list.

Hughes: *Maybe he won't have to practice ophthalmology. [laughs]*

Maumenee: That's what I said.

The senior resident is really like a chairman of a small department, because he runs the residency. He sets up the lecture schedules and the teaching periods, assigns who's going to do what, and supervises them. Some senior residents do a better job than others, because it requires them to do a lot of teaching.

One of the things that makes the Wilmer Institute outstanding is that the residents are on their own. They have to make up their minds, and they have to read and study to understand the cases they're seeing. Comparisons are odious, but at Harvard, there are two or three attending men in the clinic, and they tell the residents everything to do and diagnose every case. In a way, it's good teaching, but on the other hand, the residents just don't get an independent

experience. They operate with the attending men from the clinic, and the attending man may decide that he wants to do a case himself, and the resident has to help him, even though it's a clinic patient.

Hughes: *Is there any other institution that gives residents the independence that the Wilmer does?*

Maumenee: I think there are a number of them. The residents that I've trained who have become departmental chairmen have modeled their program after the Wilmer Institute.

Guiding Residents

Hughes: *Other than hoping that your residents went into research, into the academic life, what else did you expect of them?*

Maumenee: That's the major thing. Also that they were honest and capable of getting along well with their fellow residents.

Hughes: *Did you hope that they would be interested in surgery as opposed to medical ophthalmology?*

Maumenee: No. Whatever they were interested in, if they did it well, that was fine. I didn't push a surgeon more than a basic science person or a neuro-ophthalmologist or any other subspecialist.

Hughes: *You said that you didn't particularly like neuro-ophthalmology and hadn't published in that field. Some of the reason that you weren't particularly attracted was because it consists of more diagnosis than treatment. Do you think it was also because it isn't a particularly surgically oriented subspecialty?*

Maumenee: It was primarily a specialty in which diagnosis was the most important aspect. There was little medical or surgical treatment for many of the neurological diseases that affected the eye, and I was more interested in treatment than diagnosis.

When I was in medical school, as I told you, I went down every Saturday and worked with Foster Kennedy, who was a great neurologist—a number of syndromes were named for him—and Samuel Wortis, who was also a very outstanding neurologist. It was wonderful. It's a mental challenge, it's more like playing chess, to diagnose what these patients have. Once you've played chess, there's no treatment.

At Hopkins, they've combined neurology, neurosurgery, psychiatry, neuropathology, and neuropharmacology into the Mind-Brain Institute. All these disciplines work together, and they're coming up with drugs that treat schizophrenia and Huntington's chorea, and other conditions. So it is getting to the point where treatment is available for some of these neurological problems.

Hughes: *Ron Smith talked about your love of debate or friendly argument over a medical or surgical topic.* Do you think you use debate as a means of instruction?*

Maumenee: Yes, absolutely. If someone had given a lecture and I thought he was wrong, it was wonderful fun to debate with him. I always said that anything that you know now, ten years from now it'll be wrong, because medicine is about 90 percent witchcraft. [laughter]

Hughes: *Are you sure you want to have that published, Dr. Maumenee? [laughs]*

Maumenee: I've said it enough times in public. Go right ahead and use it.

Hughes: *Dr. Goldberg said this morning that he felt that you always had higher goals for an individual resident than he had for himself, so then he felt compelled to meet your expectations.** Were you conscious of that?*

Maumenee: Well, I certainly pushed residents as hard as I could.

Hughes: *Were you conscious of being tougher on some residents than on others because you knew that they could take it?*

Maumenee: I would say more that I would try to use them as examples of what a resident ought to be.

We'd have as many as eight or nine hundred people come to the Wilmer residents' meeting, and the residents would have to get up in front of the crowd and talk. The comments from the visiting doctors were, "My goodness, your residents are certainly the most articulate speakers that we've ever heard. They're so alert."

Hughes: *Did you make an effort to instill ethics in your residents?*

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* Interview with Ronald E. Smith, MD, November 1, 1989.

** Interview (not tape-recorded) with Morton F. Goldberg, MD, May 18, 1990.

Maumenee: I always told them that the patient had to come first. If the patient had a complaint, I didn't want them to tell him to wait until tomorrow morning. I wanted them to tell him to come in that night and they would go over to see him. The patient came first. If the resident put off seeing a patient, he really caught hell.

Hughes: *So you could get angry?*

Maumenee: Well, the residents said I did. They were scared to death of me. When I would help them operate, they would have such a tremor, and I didn't mean to frighten them. I found that giving them Enderol blocked their tremor, so I would make them take it before they operated. They said, "Look, that's going to slow down our mental processes. We won't be able to think." I said, "It's not going to slow you down."

Hughes: *How would you characterize your relationship with your residents?*

Maumenee: Oh, I played golf with them. I played tennis with them. I told you about the summer house that we called Focal Point. We would go down for weekends. They would bring their wives and children and swim and sail and have a good time together.

Louise Friedenwald said, "I hear some of the residents call you the Prof. That's terrible. They ought to call you Professor Maumenee." I said, "Louise, it doesn't make any difference to me what they call me as long as they work."

Hughes: *What was the most important concept you were trying to get across to your residents?*

Maumenee: I thought they ought to keep up with the literature, meaning they ought to read the basic books, like Duke-Elder's. They ought to have a good knowledge of ophthalmology. We quizzed them constantly on what they knew. Whenever I could, I would try to get them to come up with different ways of doing things, different operating procedures, something innovative, because that to me was the heart and soul of somebody who was going to accomplish something.

Subspecialization in Ophthalmology

Hughes: *What is your feeling about subspecialization in ophthalmology?*

Maumenee: I think it's fantastic. The beauty of an academic center is that you can work in neuro-ophthalmology where you can't charge patients very much because there is often no available treatment. Neil Miller, a neuro-ophthalmologist at Wilmer, does a little surgery, but there's no way he can make any great amount of money. The rest of the staff realize that, so we supplement his salary through the high earners, who make many times his salary.

Hughes: *Do the high earners resent supporting the low earners?*

Maumenee: I don't think so. It's always been explained that they're in a privileged academic position, that they get referrals, that if they'd gone out into practice, it would have been very difficult for them to build up a reputation. They have time off to write books and to do research and other things that bring them to the top of the ladder in their field. Somebody in private practice may have to do refractions and waste time doing minor things that really aren't important in order to earn enough to keep his office going. He just can't afford to specialize very much. You get good by doing the same operations over and over. You modify and keep improving them.

Hughes: *Yet you have never looked at yourself as a specialist, have you?*

Maumenee: No, but I've always operated quite a lot.

Hughes: *But not in any one field; you've done a lot of different types of operations.*

Maumenee: Yes. Well, I don't think I would have ever been the world's greatest retinal surgeon. I didn't like that field particularly. And I don't like plastic surgery. People always want to look like some Hollywood beauty queen, and they never look that way. I did a fair amount of plastic surgery at Stanford. At that time, people didn't specialize; they did everything. As people came along who could do procedures better than I, I sent all my cases to them. So they finally narrowed me down to cataract and corneal transplants. I did a lot of glaucoma operations until Harry Quigley came along, and then I began to refer the patients to him.

Hughes: *So you thought of yourself as a glaucoma and cataract and transplant surgeon?*

Maumenee: I developed instruments for glaucoma, cataract, and corneal transplant surgery.

Retinal Surgery

Hughes: *Why didn't you particularly like retinal surgery?*

Maumenee: It was very time consuming. The visual results were rather poor. If the retinal surgeon could get someone to see 5/200, he considered that a success because the retina was back in place. But frequently the retina had been detached long enough that the macula had degenerated and the patient didn't have good visual acuity. It was very tedious and difficult surgery. In the indirect ophthalmoscope, everything you see is upside down.

When I came back to Baltimore in 1955, I probably did as many retinal cases as anybody on the staff here. Harold Pierce was just getting started, and he did nothing but retina. He soon did more cases than I did. But at first I was doing as many as he did, and certainly at Stanford I did as many as anybody but Pischel.

Hughes: *Did you pay attention to what Dr. Schepens was doing in the field of retinal surgery?*

Maumenee: Yes, I knew. I didn't always agree with Charlie. I thought he did some good things. The operation for shortening the sclera or in-buckling the choroid and retina was done well before Charlie Schepens came along, although he improved the technique a lot. We would take out a full-thickness piece of sclera and thereby shorten the eye instead of putting a buckle around it and pushing everything in. [Ernst] Custodis buckled the sclera with a piece of plastic of some kind and did not remove sclera.

Hughes: *Did Schepens get his idea for the buckling operation from Custodis?*

Maumenee: Well, how do I know? Schepens may have had the idea at the same time. Schepens used tubes that wrapped all the way around the eye. [Hermenegildo] Arruga used a piece of very heavy suture material. I tried that on a couple of patients,

and in two or three years the suture would cut through the sclera and the retina would be hanging out on the suture like clothes on a clothesline. [laughter]

Hughes: *Did you ever watch Dr. Pischel operate?*

Maumenee: Oh, yes. He was very meticulous and very good.

Hughes: *I would expect him to be meticulous.*

Maumenee: Dave Cogan picked various people to write review articles once a year on what had happened during the year in their field.

Hughes: *For the* Archives of Ophthalmology*?*

Maumenee: For the *Archives*. For four or five years I wrote the review on the retina. I took all of December off and spent the time in the library looking at every journal—medical, surgical, and everything else—that mentioned retina or vascular diseases of the eye.

Schepens began to write about how much more you could see with the indirect ophthalmoscope. Well, Pischel was so good with the direct ophthalmoscope that he could pick up holes that were out in the periphery. I wrote that I didn't think that the indirect ophthalmoscope was that much of an advance, because Pischel could see everything with the direct ophthalmoscope and get just about as good results as with the indirect ophthalmoscope. Well, that changed, because as time went on ophthalmic surgeons did more and more difficult cases that Pischel would say were hopeless. They would cure them, because they could see better and farther in the periphery with scleral depression and the indirect ophthalmoscope. With the indirect ophthalmoscope you can see all the way to the ora serrata.

Photocoagulation

[Interview 5: October 14, 1991, annual meeting, American Academy of Ophthalmology, Anaheim, California]

Hughes: *When did you begin to use the xenon arc photocoagulator, Meyer-Schwickerath's invention?*

Maumenee: Dr. Alan Woods, the former director of the Wilmer, went to Europe for some meeting and saw Meyer-Schwickerath's xenon photocoagulator. This was a big, bulky machine that weighed about two tons and was very difficult to handle. But he came back and said that it was a fantastic new piece of equipment. So I bought one immediately for the Wilmer Institute, and we began using it to obliterate vessels in the back of the eye that were bleeding, and in diabetes and Von Hippel's and Coats's disease. We used his light to obliterate various vascular abnormalities in the fundus.

Hughes: *Dr. [DuPont] Guerry was one of the first to try photocoagulation in this country, because he received one of the first Zeiss machines.**

Maumenee: Actually, Verhoeff, who wrote a book in 1917 or 1918, mentioned using a carbon arc light to burn the retina.**

Hughes: *Was photocoagulation an easy technique to pick up?*

Maumenee: Yes. You looked in through an ophthalmoscope, and you had a button you punched. You see, light is heat, and the xenon light gave off enough heat to obliterate the vascular abnormalities.

Hughes: *You could target it pretty reliably?*

Maumenee: You obliterate very small areas of newly formed blood vessels or aneurysms.

Hughes: *Would you consider the xenon light a real advance over diathermy?*

Maumenee: Yes, because you didn't have to operate on the eye; you went right through the pupil. It didn't damage the lens or the cornea or anything else because you focused it on the retina.

Hughes: *Dr. Pischel said there were initially only three photocoagulators in this country, one with DuPont Guerry in Virginia, one with Graham Clark in New York, and Dr. Pischel had one as well.*** He didn't mention the instrument at the Wilmer. How long did it take for photocoagulation to catch on?*

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* See the oral history in this series with Dr. Guerry, pp. 131–37.

** Verhoeff FH, Bell L. *The Pathological Effects of Radiant Energy on the Eye: An Experimental Investigation.* Boston: American Academy of Arts and Sciences, 1916.

*** See the oral history in this series with Dr. Pischel, p. 79.

Maumenee: Within a few years, it became a standard piece of equipment for most of the larger ophthalmic institutes in this country and in Europe. The argon laser was developed by Fran L'Esperance in New York. Arnall Patz had the Johns Hopkins Applied Physics Laboratory make one for him. But then some commercial companies made much less cumbersome ones. You could hold the ophthalmoscope with an argon photocoagulator, whereas with the xenon ophthalmoscope, it was on a long bar. You had to move the bar around to focus on the retinal lesion. It was very awkward to use, but it was very effective.

Hughes: *These instruments were progressive improvements in technique, moving from diathermy to the laser.*

Maumenee: That's right.

Hughes: *And techniques that were readily accepted into ophthalmology?*

Maumenee: Yes.

Meyer-Schwickerath said that obliterating the vessels in the periphery of the fundus in diabetes would stop the progress of the retinopathy. He claimed that his machine was more like a shotgun. It created a much bigger area of burn than the laser beam, which was like a rifle—just one little hit. So people had to use a thousand or two thousand blasts of the laser beam to knock out the vessels, whereas he could obliterate them with many fewer shots with his xenon light. So, until quite recently, he continued to use the xenon light rather than the laser.

Hughes: *But not other people.*

Maumenee: Not other people. Hunter Little, who went to Palo Alto [California, the location of Stanford University], did extensive work with diabetic retinopathy, along with Chris Zweng. They refused to enter the double-mask study of the laser obliteration of the peripheral retinas in patients with diabetic retinopathy that the National Eye Institute started, because they said they knew obliteration of the diseased retina stopped the progress of the retinopathy. They weren't going to give their patients a placebo when they knew laser treatment worked.

Hughes: *Have you said enough about macular disease?*

Maumenee: We did an extensive classification of macular disease.* Once you began to break down macular disease into definite integers, then you could look for a specific etiology for them. When you lumped everything under "macular disease" and treated everything, you could not get a clear answer as to the value of laser therapy. But when you defined the problem as histoplasmosis or vascular lesions outside of an avascular circle of the macular area, you could treat those conditions with photocoagulation and stop the bleeding.

I understand from Brad Straatsma's discussion last night that they are now picking up the retina and exposing the small vessels that come through Bruch's membrane and coagulating them to prevent hemorrhage. It's unbelievable that they can do that and get the macula to go back in place. They aspirate the blood that's there, because the hemorrhage keeps nutrition from getting to the rods and cones and fibrous tissue forms.

Research on the Cornea**

Research on Rejection

Hughes: *Please go back to the work that had been done on skin rejection and how that led to your research on the cornea.*

Maumenee: I had read a paper by Peter Medawar, who later won the Nobel Prize for his work on tissue rejection.*** Medawar had not been able to explain why the cornea doesn't reject. I felt that this problem would be a wonderful thing to work on.

What was different about the corneal cells from other cells in the body? I had the machine shop make me a copper cone on a stick to use as a cryoprobe. I would put it in dry ice and absolute alcohol which was at a temperature of minus 78 degrees Fahrenheit. I could put the cryoprobe on the cornea and freeze the cornea and kill all the cells in the cornea.†

* Maumenee AE, Emery JM. An anatomic classification of diseases of the macula. *Am J Ophthalmol* 1972; 74:594–99.

** Parts of a discussion of research on the cornea from Interview 1, May 14, 1990, are incorporated here.

*** Medawar PB. Immunity to homologous grafted skin. *Br J Exp Pathol* 1946; 27:9–14.

† Maumenee AE, Kornbleuth W. Regeneration of the corneal stromal cells. I. Technique for destruction of corneal corpuscle by application of solidified (frozen) carbon dioxide. *Am J Ophthalmol* 1948; 31:699–702.

Then we would give the animals methylene blue and other dyes intravenously so that the macrophages in the bloodstream would pick them up. When the animals' corneas regenerated, we would kill the animals and enucleate them and see that the cells contained methylene blue.

We knew that the cells that made the cornea regenerate were macrophages.* There was very little mitosis of the corneal stromal cells. Everybody thought that they were specific cells, but they were actually macrophages in the environment of the mucopolysaccharide, which is called keratosulfate, in the cornea. The keratosulfate made these cells turn into keratocytes.

Hughes: *None of this was known before you did this research?*

Maumenee: No. This was the first time it was done.

Dr. Walter Kornblueth came over from Israel to work with Jonas Friedenwald. Jonas asked if I would let Walter work with me, and Walter and I did work together for three or four years. When I moved to Stanford after the war, Walter went with me and we continued to work on the cornea.

Hughes: *How did people explain corneal rejection before you came along with this macrophage idea?*

Maumenee: [Ramon] Castroviejo was the leading corneal expert. He claimed that it was uveitis due to sinus infection because there were inflammatory cells in the eye that were caused by the antigens of the endothelial cells which were different than those in the recipient. The killer lymphocytes would come in and destroy those cells and set up an inflammatory rejection. They all considered this inflammatory reaction the cause of the loss of corneal transparency.

There is a monograph written by Paufique, Sourdille, and Offret called *La Maladie du Greffon,* which was published in 1948.** They said that the immune reaction killed the graft in the first week. After that it was the nutrition to the graft that caused it to go bad. Failure was due to an invasion of the defective host tissue. They are credited as the first to describe that the immune reaction killed the graft. But they were all wrong because it takes at least two weeks for skin

* Maumenee AE, Kornbleuth W. Regeneration of the corneal stromal cells. II. Review of the literature and histologic study. *Am J Ophthalmol* 1949; 32:1051–1064.

** Paufique L, Sourdille G-P, Offret G. *Les Greffes de la Cornée (Kératoplasties).* Paris: Masson & Cie, 1948.

or a kidney or any other tissue to sensitize an animal. Yet people write that they were the first to discover corneal graft rejection due to an immune reaction. Once the graft is sensitized, the secondary reaction occurs quite rapidly.

We did a study to try to find whether the nerve supply to the cornea was the reason why the graft went bad.* We cut out all the cornea tissue in a circle around the limbus, thus cutting off all of the corneal nerves coming in. We found that Descemet's membrane and the cornea stayed perfectly clear. When the cornea and nerves regenerated, the cornea would be perfectly clear because the corneal lamellae weren't disturbed.

Hughes: *Was that work that had been done before Art Silverstein came to Wilmer?*

Maumenee: Way before. Actually my paper in the *AJO* in 1951 described everything Art Silverstein and Ali Khodadoust talked about except that I didn't do as detailed a study as they did.** They perfected the description of the sequence of events that I described. I described the pathology and the fact that cortisone would stop the reaction. My idea was that the cornea was avascular, and therefore the white cells couldn't normally get to the cornea unless it was vascularized. The white cells couldn't get to the cornea to find that it was a foreign body. The body tries to reject any foreign body.

I transplanted skin from rabbit A to rabbit B, and when rabbit B rejected the skin transplant, then I transplanted the cornea from rabbit A to rabbit B, and the cornea would reject because the animal was already sensitized. The inflammatory reaction from the operation would cull out the lymphocytes and cause rejection. The cornea would become cloudy just as it does in the human.

Immunologic Privilege

Hughes: *Dr. Silverstein talked to me about the immunologic privilege of the cornea.*** *Could you expand on that concept?*

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* Kornbleuth W, Maumenee AE, Crowell JE. Regeneration of nerves in experimental corneal grafts in rabbits. Clinical and histologic study. *Am J Ophthalmol* 1949; 32:651–59.

** Maumenee AE. The influence of donor-recipient sensitization on corneal grafts. *Am J Ophthalmol* 1951; 34:142–52.

*** Interview with Arthur M. Silverstein, PhD, March 15, 1990.

Maumenee: It is only that the cornea doesn't have any blood vessels in it, and that's why it is privileged. Everybody thought that the corneal cells, the keratocytes, were privileged, and they wouldn't react immunologically. [M. F. A.] Woodruff from England was one of the main people who said the cornea was a privileged tissue.* It didn't carry any of the antigens.

Hughes: *Therefore, it was an exception to Medawar's hypothesis?*

Maumenee: Yes. Nobody could make it turn cloudy. Actually, Medawar and Billingham took the corneal epithelium and put it on the skin and showed that it would reject, but they didn't include the stroma. The stroma has so few cells in it. Walter Kornblueth and I took off all the epithelium and endothelium and put the cornea under the skin of an animal and showed that it would reject. The fact that we could freeze the cornea and show that it didn't have specific cells showed that the only privilege was that it didn't have any blood vessels.

Hughes: *Otherwise it followed the theory.*

Maumenee: Otherwise it acted like every other tissue.

Hughes: *Is there more to say about corneal opacification?*

Maumenee: The other thing we became interested in was why the cornea became edematous. There were lots of basic scientists working on the endothelium. They figured out that there was a pump mechanism that pumped fluid out of the cornea because the cornea gets all of its nutrition from the aqueous of the eye. Nobody could figure, if nutrition went in, why the cornea didn't swell from the aqueous going in.

We cut a piece of a paper clip about one millimeter long and made a small incision into the anterior chamber at the limbus and put the piece of metal into the anterior chamber of the eye. After it had healed, we would pull a magnet across the back of the cornea and destroy the endothelial cells without making another incision. We showed that the cornea swelled as soon as the endothelial cells were rubbed off. This had been done before by David Cogan. We had the idea that if the endothelial cells kept the aqueous out of the cornea, the best thing to do when the cornea was edematous was to put Saran

* Woodruff MFA. *The Transplantation of Tissue and Organs.* Springfield, Ill.: Charles C. Thomas, 1960.

Wrap over Descemet's membrane, which made it impermeable and then the aqueous couldn't come in.* We thought we could cure endothelial dystrophy that way. We did do that in rabbits, and sure enough the cornea stayed absolutely clear. But, unfortunately, within two or three weeks the cornea would begin to melt over the Saran Wrap because all the nutrition to the cornea came from the aqueous. Since the nutrition couldn't get through, the technique didn't work.

Ali Khodadoust

Hughes: *Please tell me about Ali Khodadoust's work.*

Maumenee: Ali is from Shiraz, Iran, and he was top of his class at the university there. He applied to me for a fellowship, but I never took any foreign fellows because I had so many good people applying from American schools. Stewart Wolff had met him and told me that he was a very smart guy.

Finally, after he had persisted so long, I brought him over for a one-year fellowship. He worked so hard and was so brilliant, I took him as a resident. Somebody on the house staff dropped out for some reason, so I had Ali take his place. Ali then went through the residency. He worked night and day with Art Silverstein on really exquisite research.

When I was working with Horst Mueller from Germany, we bled animals to death and put their serum in the anterior chamber and could never make them reject. We were really not the first who showed that the white blood cells were the reason you got rejections. Ali repeated that research and made beautiful pictures of flat preparations of the endothelium with a single lymphocyte attacking and eating the endothelial cells. He did a number of good experiments along that line. He also showed quite exquisitely that all three layers of the cornea could reject.

Cortisone Treatment

Hughes: *In a paper that you published in 1951, you suggested cortisone treatment.***

Maumenee: That's right.

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* Bock RH, Maumenee AE. Corneal fluid metabolism. Experiments and observations. *Arch Ophthalmol* 1953; 50:282–85.

** Maumenee AE. The influence of donor-recipient sensitization on corneal grafts. *Am J Ophthalmol* 1951; 34:142–52.

Hughes: *Wasn't cortisone very new?*

Maumenee: It was brand new.

Hughes: *Was it being used in ophthalmology at that point?*

Maumenee: No.

Hughes: *How did you come to suggest it?*

Maumenee: I heard there was somebody from Canada who had shown that cortisone worked on allergic reactions and arthritis. In general medicine, cortisone was well known. It might have been used topically in the eye for iritis, but it had never been used to block an immune reaction to the corneal graft.

Hughes: *Was it immediately successful?*

Maumenee: Yes. It blocked the immune reaction.

Hughes: *I know from talking to Dr. Thygeson that there were some problems later with the use of cortisone in ophthalmology.**

Maumenee: There was tremendous prejudice, as there is with everything new. For fifteen years, people claimed that the cornea did not reject and that uveitis was causing the problem. I remember going to a meeting where I was so fed up that I said, "The longer you keep fighting corneal rejection, the better it's going to make me look in the end. [laughter] You bigwigs just don't know what you're talking about."

Alan Woods hated cortisone. He blamed cortisone for all the bad reactions that occurred in uveitis and said it was the most horrible drug that ever had been introduced into medicine. There was some evidence that cortisone made people more susceptible to infections.

Thygeson and Alan Woods were terrible critics of it. Daniel Gordon said, "I treat all my uveitis patients with cortisone and they do better." Alan Woods called him a liar, but Gordon was right. Cortisone did cut down the inflammatory action. But if given enough time, it suppresses the adrenals. You get a moon face and osteoporosis. If used topically on the eye, it causes a marked elevation of pressure, just as in glaucoma. It also causes cataracts to develop. There are complications to any drug, particularly if it is overused.

* See the oral history in this series with Phillips Thygeson, pp. 172–73, 241–42.

Corneal Hypersensitivity

Hughes: *Fred Germuth was also working on corneal immunology at Wilmer.*

Maumenee: Arnold Rich, chairman of the Department of Pathology, was a brilliant guy. He did a lot of work on tuberculosis. There were two types of sensitivity, delayed hypersensitivity and immediate hypersensitivity. Those were the two terms used at the time. It turns out that one is humoral hypersensitivity which is related to serum reactions. For example, if you give an animal egg white or horse serum, you would get a reaction. If you use tissue, you get a delayed hypersensitivity. Humoral hypersensitivity comes on much more rapidly than delayed hypersensitivity.

Hughes: *Had that all been worked out?*

Maumenee: That had been worked out by Arnold Rich. So we decided to look at the cornea and see if this was really true.

Germuth was Arnold Rich's right-hand man. He was assistant or associate professor. So I went over to talk to Fred, and I said, "Let's use the cornea to see if Rich is right. I don't think he is. I think it is something else." We injected antibody on one side of the cornea and antigen on the other. That is, we would sensitize an animal to horse serum and get its antibody out of the plasma. We would inject that on one side, and we would inject horse serum on the other side. When they came together, it was just like an Ochterlony plate. Ochterlony showed that you could put antibody on one side of an agar preparation and antigen on the other, and they would come together and make a precipitate.

We did that in the cornea to see if we could produce a delayed hypersensitivity reaction and necrosis. I think Fred wrote a paper saying that there was some evidence that it did cause necrosis.* But it was so minimal, I never agreed with it. Delayed hypersensitivity didn't turn out to be a factor.

* Germuth FG, Maumenee AE, Pratt-Johnson J, Senterfit LB, et al. Observations on the site and mechanisms of antigen-antibody interaction in anaphylactic hypersensitivity. *Am J Ophthalmol* 1958; 46:282–86.

I got Jim Parks, who had a PhD in immunology, a $6,000-a-year scholarship to go through medical school if he would do research work in ophthalmology. So with Howie Leibowitz we did a lot of studies on transferring delayed and humoral hypersensitivity. We wrote a series of papers, showing that we could produce delayed hypersensitivity by injecting white blood cells as opposed to injecting serum.* This was basic science. It really had no clinical application.

Hughes: *Was there research going on at Wilmer that was having a direct impact on corneal transplantation?*

Maumenee: I pointed out that if the cornea was vascularized from a disease or ulcer or chemical burn, we would get 70 percent rejection. If it was a keratoconus, or a macular or granular dystrophy, or some avascular clouding of the cornea, we could get almost a 90 percent take of the cornea graft without having a reaction—if we could educate the local doctor to put the patient on steroids the first time he saw any evidence of cells in the anterior chamber. Frank Polack from Tallahassee, Florida, showed that steroids would kill the white blood cells on the back of the cornea. We could save a lot of corneas if we treated them right away with intensive topical steroids. In the Ciba Symposium publication that came out much later, there is a very good review of this work.**

Hughes: *Were immunologists interested in the work that was going on on the eye?*

Maumenee: They were interested enough to invite me to all their meetings. For instance, I went to the Harriman House in New York. I went to meetings in England. I lectured to the immunologists when I was visiting professor at Guy's Hospital in 1958.

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* Parks JJ, Leibowitz HM, Maumenee AE. The effect of route of inoculation upon development of antibody in rabbits. *J Immunol* 1961; 87:199–204.
Leibowitz HM, Parks JJ, Maumenee AE. Manifestations of localized hypersensitivity in a previously sensitized tissue. *Arch Ophthalmol* 1962; 68:66–71.
Parks JJ, Leibowitz HM, Maumenee AE. A transient stage of suspected delayed sensitivity during the early induction phase of immediate corneal sensitivity. *J Exp Med* 1962; 115:867–80.
Parks JJ, Leibowitz HM, Maumenee AE. Immediate hypersensitivity reactions in the cornea of the guinea pig. *J Immunol* 1962; 89:323–25.

** Maumenee AE. The role of steroids in the prevention of corneal graft failure. In *Symposium on Corneal Graft Failure, London, 1972.* Ciba Foundation Symposium 15 (new series), Amsterdam/New York: Elsevier, 1973, pp. 241–55.

Hughes: *Dr. Silverstein told me about a combination of workshops and conferences on ocular immunology that you organized, beginning in 1957.* Were those conferences an outgrowth of the work that you were doing on the cornea?*

Maumenee: It was partially an outgrowth of my work on graft rejection, but really primarily the work of Jim Parks and Howie Leibowitz and what we had done on the cornea. Then Art did a whole lot of work along those lines too. He started the immunology group at Hopkins, which people from the basic sciences attended. I never participated; they were over my head.

Hughes: *Was that a weekly conference?*

Maumenee: No, they met periodically. Art was not only a good immunologist, he had a very sound philosophy. Whenever I had problems in running the department, I would go to Art and get his advice.

Contesting the Theory of the Corneal Endothelium Pump

Hughes: *I want to quote again from the letter that Marvin Sears wrote to me: "In the field of corneal transplantation and corneal physiology, [Dr. Maumenee's] demonstrations were the first physiologic demonstrations of how fluid truly moved through the cornea and what the importance of the corneal endothelium was. He did this with plastic membranes in some very memorable and important studies that have long since been written out of the literature by those entrepreneurs who are not scholars. He was the first one to emphasize repeatedly and consistently the importance of delayed reaction to the graft or an immunogenic reaction of the corneal graft. He also indicated ways of avoiding this reaction and contributed immeasurably to the field of corneal transplantation in this manner."***

What does he mean by "written out of the literature by those entrepreneurs who are not scholars"?

Maumenee: My work was crude compared to the work of Dave Maurice and Keith Green and Dave Spector. They showed that some salts would be held back and other products would be allowed to go through the cornea. They worked out the pump

* Interview with Arthur M. Silverstein, PhD, May 15, 1990.

** Marvin L. Sears, MD, to Sally S. Hughes, PhD, October 26, 1989.

mechanism of the endothelium, whereas my worry was to show that putting Saran Wrap over Descemet's membrane blocked exchange, that there was a pump. Other people said, "Well, all the exchange comes from the limbus." This was very early on.

I had lots of arguments of why it couldn't be a pump. For instance, if you have an epithelial ingrowth, if the conjunctival epithelium grows down into the eye and onto the back of the cornea after an intraocular operation, the cornea doesn't become edematous. Why would the cornea be crystal clear over an epithelial ingrowth, if the endothelium with its pump was absent? I argued that very heavily, which turned out to be wrong. Dave Maurice and the others showed that the epithelium was enough to block the fluid from coming through and that the rest of the endothelium was enough of a pump to keep the cornea clear. They all showed that the tears were pumped in the cornea from the outside through the surface of the cornea.

I would object: "Why wouldn't fluid be pumped into the cornea from the back?" In the Cogan lecture [never published], about 1960, I tried to defeat the idea that there was an actual pump mechanism in the endothelium. But other people who did very sophisticated work on isolated corneal material, particularly Dave Maurice, showed without any question there was a pump.

Developing Media, Sutures, and Instruments for Corneal Transplantation

Hughes: *David Paton wrote in the festschrift in the* AJO: *"[Dr. Maumenee] has been one of the early champions of the continuous 10-0 nylon suture for securing penetrating grafts, an ardent exponent of the Flieringa ring for scleral support in aphakic keratoplasty, and has devised numerous instruments for tying, grasping and suturing—many of which bear his name."* * *Please explain some of those terms and their significance.*

Maumenee: When a person died, we would get the family to give us the eyes. The cornea doesn't last more than twenty-four or forty-eight hours at the most because the aqueous doesn't have enough nutrition in it to maintain the endothelial cells, and the endothelial cells die.

* Paton D. The surgery of A. Edward Maumenee. *Am J Ophthalmol* 1979; 88:297.

Then B. E. McCarey in Michigan invented a tissue culture medium that would keep the endothelium alive. Herb Kaufman [then at the University of Florida at Gainesville] took him on as a staff member. Herb placed corneas removed from animal eyes in the medium and showed the endothelium survived for three or four days. In 1962, when I was a visiting lecturer at the University of California, Herb Kaufman was there, and he described the McCarey medium. I immediately brought it back to the eye bank in Baltimore. We used it right away to keep corneas going. I think we were the first eye bank in the country to use the medium to preserve human corneas for transplantation.

In the early 1960s Joaquin Barraquer began to use 9-0 virgin silk suture which caused much less inflammatory reaction than the larger 5-0 to 6-0 silk suture. I switched to these. At about the same time, [H.] Harms and [Guenter] Mackensen began to use 10-0 single filament sutures. I argued on television at the AAOO [American Academy of Ophthalmology and Otolaryngology] meeting that the nylon was too stiff and hard to use and was no better than Barraquer's virgin silk. Again I was wrong, for once I learned to use the 10-0 nylon, it was much better and caused less inflammatory reaction. The knots were so small you could bury them in the tissue, and then the epithelium would grow over the suture and there wouldn't be any way for infection to get into the tissue.

I devised some suturing techniques and instruments to handle very fine suture because the crude instruments we had couldn't catch a 10-0 suture. It would just slip right through the tying forceps.

Hughes: *Fine sutures were not available before World War II.*

Maumenee: That's right. They were developed in Germany. I became good friends with Paul Haffee at Johnson and Johnson. We pointed out to him the real value of fine sutures, and he got Johnson and Johnson to make nylon sutures. They made them better and better so that they were strong enough to hold. You just had to put in more sutures and not permit patients to bump their eyes. Fine sutures were a real advance, and everybody uses 10-0 nylon sutures now to close cataract wounds and other types of incisions.

Hughes: *The sutures are not ever removed?*

Maumenee: Well, there were some people who said that they shouldn't ever be removed, so I went through a phase of leaving them in

for two or three years. But then they biodegraded. The body would finally dissolve them and they would break. When they broke they were still stiff, and so they would stick out of the epithelium. Where the epithelium was broken, bacteria could get in and cause an abscess. They were impossible to take out because they were so friable and brittle they just broke apart. So I went back to taking them out at the end of a year. Even at the end of a year, sometimes the wound would open when I took them out.

Hughes: *Did you have a relationship with a specific surgical instrument maker?*

Maumenee: John McLean, Jack Guyton, and I gave a course on cataract surgery at the annual meeting of the Academy. For fifteen years, our course was the first one sold out. We had a lot of ideas about instruments of one sort or another that would help do things a little better. Eric Storz of Storz Instruments was always great. He would make them for us right away, whereas Mueller and Grishaber were more staid and they wouldn't listen to us. After all, we were quite young, and they didn't think we had the stature to sell their instruments with our names because nobody knew us.

I talked to Eric Storz in the exhibit hall about getting rid of astigmatism in corneal grafts. I got Storz to make a trephine with a handle on it and put a cross line at 12:00, 9:00, 6:00, and 3:00. Then I dyed those little cross lines, and I would get four exact places for sutures in the graft. I could do the same thing with the whole eye, and I would get four exact places in the whole eye. If you draw a circle with an ordinary compass and you move the point of the circle over a half a millimeter, you will find that one side comes way out and the other side will be too short. That will cause thirteen diopters of astigmatism.

Hughes: *So it is not a small point.*

Maumenee: That's right. Besides allograft rejection, astigmatism is still one of the major problems in corneal grafting, because nobody has figured out a way to align the graft to avoid astigmatism. I have made the marks on the recipient, but I haven't been able to figure out any way to make the mark on the donor corneal button because we use the cornea and turn it upside down. If you damage the endothelial cells, then the graft doesn't work very well.

I designed a pair of forceps that had two sets of teeth which held the needle. There were two teeth on one blade of the forceps and two teeth on the opposite blade. If you have just one set of teeth to hold things together, the needle twists and the suture won't go in straight and it skews the graft. But if you have two sets, and you grab the corneal tissue so that now you can put your suture between these two, you've got two stable points. You can put the suture exactly vertically through.

Hughes: *Dr. Paton mentioned the Flieringa ring for scleral support.**

Maumenee: If the lens is in the eye and you make a hole in the cornea, it stays pretty much a round hole. If you have had a cataract extraction—and most of the grafts we do are secondary to damage done at the time of cataract extraction—there is no lens in the eye, so you have a suture above and below, and when you cut a circle, it immediately becomes an oval. Putting the ring which H. J. Flieringa designed to go around the cornea helped stabilize it so that the hole would stay more like a circle than an oval.

Hughes: *Were you one of the first to introduce the ring into this country?*

Maumenee: No. I did a lot of talking about corneal grafts and I mentioned it a lot. [Girolamo] Bonaccolto, from New York, claimed that he invented the ring, but Flieringa had described it before he did. Other people invented rings. Dermont Pierce from England invented a flat ring that is even more stable. They come in various sizes, from 11 millimeters to 15 millimeters in diameter.

Vitreous Surgery

Hughes: *I would like to move on to vitreous surgery and to quote David Paton, who stated definitively: "In 1957, Maumenee initiated present-day vitreous surgery." ** Please explain what you did.*

Maumenee: When a patient had malignant glaucoma, very high-pressure glaucoma, which at that time everybody went blind from, physicians couldn't do anything. No operation worked. I showed that there was a pocket of fluid vitreous in the eye. I had seen this pocket histologically many times in specimens

* Paton D. The surgery of A. Edward Maumenee. *Am J Ophthalmol* 1979; 88:297.

** Paton D. The surgery of A. Edward Maumenee. *Am J Ophthalmol* 1979; 88:297.

when I was working with Friedenwald. I put a needle in the eye, and I would suck out the fluid vitreous. Then the iris and the lens would fall back, and I would do an iridectomy, and the patient would be cured.

Most ophthalmologists thought at that time if you took the vitreous out of the eye it would be lost. I did not take out formed vitreous. [David] Kasner did that. He would make his residents push vitreous out of the eye, cut it off, and show that it didn't make any difference.

I was the first person to take fluid vitreous out of the eye. It was a dangerous thing to do because it was hard to find the pocket. A couple of times I hit the retina.

Hughes: *How could you find the pocket?*

Maumenee: Blindly.

Hughes: *Is fluid vitreous an abnormality?*

Maumenee: Everybody as you get older develops fluid vitreous. If you have uveitis or you have had trauma to the eye, you get fluid vitreous earlier.

Hughes: *Dr. Paton referred to "open-sky aspiration of fluid vitreous."* What does that term mean?*

Maumenee: That's when you have opened the eye [surgically] and the vitreous looks like it's coming forward. I would stick a needle right back through the vitreous to the fluid pocket and suck out the fluid, and the vitreous would fall back in the eye.

Bob Machemer developed the method of taking out formed vitreous with a vitreous cutter. Nick [Douvas] and others also invented rotary vitreous cutters. Some of them are punches that cut the vitreous strands and you can then suck the vitreous out of the eye. I was not involved with any of those developments.

Hughes: *Was it taboo to tamper with the vitreous?*

Maumenee: It was. I don't think my taking out fluid vitreous really stimulated anyone to try the method.

Hughes: *Why, do you suppose?*

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* Paton D. The surgery of A. Edward Maumenee. *Am J Ophthalmol* 1979; 88:297.

Maumenee: It just didn't catch on. It was believed for a very long time that the eye would collapse if the vitreous was removed. But when Kasner pushed out formed vitreous and cut it off and showed that it didn't hurt the eye, and that the eye would heal and be perfectly all right, that caught people's attention.

Hughes: *Was that technique safer than yours?*

Maumenee: No. He was wrong. You get more retinal detachment.

Hughes: *Was that what surgeons were afraid of if they removed vitreous?*

Maumenee: Yes. The vitreous is attached to the peripheral retina, and if you put it on stretch it will pull a hole in the retina.

Hughes: *And that was a real danger.*

Maumenee: That was a real danger.

Hughes: *Did Machemer have to be careful about how much formed vitreous he took out?*

Maumenee: No, he would cut it out so neatly that there wouldn't be any pull in the periphery.

Cataract Extraction

Extracapsular Extraction

Hughes: *My understanding is that in the past it was the extracapsular that was pretty universally performed. Am I right?*

Maumenee: The operation goes back a long way. Couching consisted of putting a needle into the side of the eye and depressing the lens out onto the vitreous, and then the patient could see. This happens spontaneously in a number of elderly people with mature cataracts because the zonular capsular ligament gets very fragile and falls down into the bottom of the eye.

In 1745, Jacques Daviel, a Frenchman, did a couching operation from below, for some reason. The lens must not have been mature enough because he couldn't push it back down into the vitreous. So he enlarged the incision to get a better leverage on the lens, and when he did, he broke the capsule and the nucleus popped out. That was the first

extracapsular cataract extraction ever done. That totally revolutionized eye surgery. In the couching operation, when the lenses fall back into the vitreous, they don't seem to cause much reaction for about three or four years, and then most of the patients get detachments and go blind.

The extracapsular operation consisted of removing the lens. But the difficulty was, you had to wait until the lens became completely mature. Its cortex would get totally white and fluid. In an immature lens with, say, 20/100 or 20/200 vision, the cortex was sticky enough that we didn't have any way of getting it all out of the eye. The cortex that remained in the eye caused phacoanaphylaxis—that is, autohypersensitivity to a patient's own tissue. Verhoeff was the one who first described the problem of autohypersensitivity after cataract extraction. Other people had shown that they could produce anaphylaxis in animals by sensitizing them to lens material and then injecting it, but it was a different thing from the chronic inflammation.

You tried your best to wash out the cortex, but you just couldn't do it. So the extracapsular was not a very good procedure in a lot of patients. Because there were no sutures to close the wound, you got iris prolapses and infections.

Intracapsular Extraction

Maumenee: Colonel Henry Smith was one of the first to advocate intracapsular cataract extraction—that is, taking the whole lens out. He would make an incision in the superior part of the eye and then push on the inferior part with his finger and push the lens out. He lost vitreous in about 50 percent of the cases, and a very high percentage got detachments. But he started the intracapsular cataract extraction.

Hughes: *But at quite a price.*

Maumenee: I know.

Hughes: *I read that you learned intracapsular cataract extraction under John McLean.* Were you a resident then?*

Maumenee: I was a second-year resident.

Hughes: *Was intracapsular extraction the established technique at that time?*

* Paton D. The surgery of A. Edward Maumenee. *Am J Ophthalmol* 1979; 88:299.

Maumenee: Extracapsular was the procedure of choice until about 1927. Ignacio Barraquer, Joaquin's father, invented the erysiphake, which was a little suction cup you put onto the lens and removed the whole lens in one piece. Barraquer didn't push on the vitreous, so he only had about a 10 percent vitreous loss, so his method was much better than Smith's. From that time on, intracapsular cataract extraction was so much better than leaving all the cortex in the eye and getting inflammation that it became the procedure of choice.

As I mentioned to you, John McLean, Jack Guyton, and I gave a course at the Academy probably beginning the forties. We talked about instruments and techniques that made it a lot easier to do intracapsular extraction. There wasn't any major breakthrough: [Marcel] Kalt invented forceps for grabbing the capsule and taking the lens out in one piece. Barraquer invented the erysiphake. We made better and smoother forceps [in the laboratory]. I took out the cornea and the iris, leaving just the zonules to hold the lens in place. I showed that it was not a breaking of the zonules but a breaking of the zonular capsular ligament that allowed the lens to be removed in the capsule. Our technique of removing the lens and the capsule was much simpler than the other techniques that were used, but it was not a major breakthrough. It was just a modification and improvement of the techniques used at that time.

Hughes: *By the late 1930s, was the intracapsular method the method of choice across the country?*

Maumenee: I think the extracapsular was still the method of choice. Elliott Randolph, who was the senior resident in 1937 before John McLean, said that you had to learn to crawl before you could walk, so you had to learn how to do extracapsulars before you did intracapsulars. I was one of the first residents who on the first case did an intracapsular instead of an extracapsular.

Cataract Extraction under the Microscope

Hughes: *Another thing Dr. Paton said in the festschrift is that by the mid-1960s you were using the microscope for all phases of cataract operations while most of your contemporaries were still using loupes.**

* Paton D. The surgery of A. Edward Maumenee. *Am J Ophthalmol* 1979; 88:299.

Maumenee: That's right. Again, I didn't realize the importance of it; I never wrote it up. In the 1950s, the otolaryngologists at Stanford were using the microscope to operate on the inner ear. So I borrowed their microscope and started doing goniotomies through the microscope because I could see the angle so much better.

Hughes: *Didn't that take a lot of adjustment?*

Maumenee: I had to turn the microscope upside down to focus it on the trabecular meshwork. But it was possible to do. The thing that made me stop using the microscope was the Zeiss oculars. You have objectives [lenses] at the lower end of a microscope, and you have oculars [lenses] at the upper end. With Zeiss oculars you had to get your eye right next to the ocular to see a full field. I was beginning to get presbyopic. If I took my glasses off, I could see the whole field through the oculars. But if I put them on, my eyes are so deep set, I would see only about half the field. I had such a small field, I didn't use the microscope very much.

Hughes: *I read that between 1956 and 1971, you performed something like 1,500 cataract extractions, apparently with very good results.**

Maumenee: No one had written up a large series of cataract extractions before we published our cases.** [Travis A.] Meredith, my co-author, was a resident. I said, "Why don't you go over my cases and see what kind of results there are?" It took him about two years to get all of the history and summarize my results. People use those figures as the standard for results of cataract extraction.

Hughes: *Why were your results so good?*

Maumenee: They weren't better than many other good ophthalmic surgeons. Nobody else bothered to write up that many patients.

Did you know that the first aspiration of a cataract was done in about 1000 A.D. in Mesopotamia by Ammar?

Hughes: *What did he use?*

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* Paton D. The surgery of A. Edward Maumenee. *Am J Ophthalmol* 1979; 88:299.

** Maumenee AE, Meredith TA. A survey of 500 cases of cataract extraction (at the Wilmer Institute). In: Emery JM, Paton D, eds. *Current Concepts in Cataract Surgery.* Selected Proceedings of the Third Biennial Cataract Surgical Congress. St. Louis: C. V. Mosby Co., 1974; pp. 423–26.

Maumenee: He had a needle knife with a hole in it which he would stick into the lens of the mature cataract, and he would get his assistant to suck on the tube and suck the lens out.

Hughes: *Isn't that remarkable.*

Maumenee: Yes. I have a beautiful slide that I use to give the history of cataract extraction. The technique fell out of use, and Hank Scheie repopularized it in the 1960s for congenital cataracts.

Hughes: *Knowing nothing about Ammar, presumably.*

Maumenee: He didn't quote him. [laughter]

Surgical Techniques in Cataract Extraction

Hughes: *I talked by phone with Dr. Frank Winter.* He told me that you developed a less traumatic method for removing the lens. Do you know what he was referring to? Presumably it was at Stanford because that's where Dr. Winter was a resident.*

Maumenee: Yes, that's right. I trained him. The only thing I can think of is that we were more gentle with the tissue.

Hughes: *He went on to say that you emphasized careful closure of the cataract wound and gentle handling of the tissue.*

Maumenee: As soon as I took the cataract out, I put a big air bubble in the anterior chamber so that the endothelium of the cornea wouldn't touch the vitreous. The bubble protected the endothelium and I got much less corneal edema. It was not a major contribution.

The Intraocular Lens

Harold Ridley's Posterior Chamber Lens

Hughes: *When did you take up the intraocular lens?*

Maumenee: I took it up in 1956, and I did about six cases using the Dannheim lens. I had a German fellow, [Wolfgang A.] Geeraets, and he convinced me to use the lens. The first intraocular lens was inserted by an Englishman, Harold Ridley, in 1949.

* May 9 and 11, 1990.

I learned in Barcelona that in 1750 Tadini described putting artificial lenses in rabbit eyes after taking out the natural lenses. Casaamata in 1795 put one in an aphakic human eye, but the lens was made of glass and fell back into the vitreous. So Ridley was not the first person to put a lens in an eye. He was the first to put one in a human eye, as far as we know. He put it in the posterior chamber.

I used the Dannheim lens in the anterior chamber. It was kind of a Maltese Cross. You put two arms in front of the iris and two arms in back of the iris. The results in six cases were so bad that I stopped. I only put them in children who had monoclonar traumatic cataract and could or would not wear contact lenses.

Hughes: *Ridley apparently had a hard time convincing ophthalmologists to adopt the intraocular lens. I understand that one of the reasons is that surgically he was very dexterous, so his results were better than anybody else's and people couldn't duplicate his results.*

Maumenee: Ridley chose lucite—polymethyl methacrylate—for his lens because he saw a lot of military pilots and their navigators who were hit in the eyes with lucite after the blister dome of the plane had been hit by flak. These eyes tolerated the lucite so well that a medical school student watching him operate said, "Dr. Ridley, you've just taken the lens out of that person. When are you going to put one back in so the patient can see?" So Ridley had an optician grind lucite into a round lens which he put in the posterior chamber after an extracapsular cataract extraction. It was very heavy and it had lots of impurities in it. After a while, many of these heavy lenses fell back into the vitreous and the patients went blind.

When I was in South Africa I got a scanning electron microscope picture of a lens that had been in the eye of a patient for twenty-six years. There was no biodegrading of the PMA, polymethyl methacrylate. It is still the product that is used in the majority of lenses.

Then I saw another patient when I went to Hyderabad, India. Ridley had put in a lens twenty-two years before, and she still saw 20/20. The iris was totally bound down at the lens from the inflammatory reaction to the lens, which held it in place. She had a completely bound down pupil, but she was still seeing 20/20.

Anterior Chamber Lenses

Maumenee: When the Ridley lens turned out to be bad, everyone jumped on the bandwagon and made a lens. There were hundreds of different styles of anterior chamber lenses. Nobody went back to the posterior chamber lens.

Hughes: *I understand that Ridley's initial results were good.*

Maumenee: They were great, but three or four months later all these problems occurred. Then they tried to figure out some way to get better support for the lens, so it wouldn't fall back into the vitreous. So they went to anterior chamber lenses. There were hundreds.

The *Transactions of Barraquer the Institute* of 1956 contain pictures of modifications of lenses for the anterior chamber which were presented at a symposium on intraocular lenses. But the anterior chamber lenses rubbed off the back of the cornea. Patients got corneal or cystoid macular edema and didn't do very well.

Joaquin Barraquer made the anterior chamber lens that Steve Shearing put in the posterior chamber. Shearing gives credit to Barraquer and the pictures of Barraquer's lens. By that time [in the mid to late 1950s], the polymethyl methacrylate had been purified and they had better haptics and lighter lenses, and so the lens worked.

Hughes: *You stopped inserting intraocular lenses and then, when they were improved, you got back in again?*

Maumenee: That's right.

Hughes: *When?*

Maumenee: Well, I was visiting professor at the University of Miami [1966], and Norman Jaffe showed me all these elderly people in whom he had inserted Copeland anterior chamber lenses. They were seeing and doing great. He said, "Most of these patients are only going to live five years or so, so let them have good vision for five years." He was using the lens only in people seventy years old or older.

Hughes: *That made sense to you?*

Maumenee: Well, no, it didn't. Some of them would live longer than seventy-odd years. I talked to Don Gass and Lawton Smith

and my other ex-residents who were at the University of Miami with Ed Norton. They said, "Ed, these people are just ecstatic about these lenses. You should start using them." When I went back, Norman let me look at the patients under the slit lamp. They were great. But as I have mentioned, many patients got late complications, especially when ophthalmologists began to use lenses in younger patients who lived longer.

Cornelius Binkhorst from Holland had developed a lens that would clip onto the iris, an iris-fixation lens. He claimed fantastic results with no complications. Because of his reports, I started using the Binkhorst lenses. But they were very difficult to use.

Hughes: *You mean they were difficult to put in?*

Maumenee: Yes, it was a technically difficult operation. I had to sew them to the iris to keep them in place, and the sutures were used while working over bare vitreous after an intracapsular cataract extraction. Because of all that, we didn't like them very much.

In 1978 I went to the Welch World Congress of Ophthalmology in Houston, Texas, and Shearing talked about his posterior chamber lens. With Kelman's irrigation/aspiration apparatus, you could get all the cortex out of the eye. The trouble with extracapsulars had been that you just couldn't get the cortex out. So with the irrigation/aspiration apparatus, you could get it all out and you could get great results.

So I mentioned in one of the Monday conferences that I would never do another intracapsular cataract extraction. Everybody laughed at me. They said, "This is the most absurd thing I've ever heard." But by the time Shearing came along with his lens, I was doing nothing but extracapsular cataract extractions. So we went right into the extracapsular extraction with the lens in the posterior chamber. They worked very well, we got such good results, and very few late complications with patients whom Walter Stark and I had operated on ten years before.

Hughes: *Apparently in the 1970s, the FDA [Food and Drug Administration] declared that the lens implant was a drug rather than a device. What was behind that decision?*

Maumenee: The FDA had a committee on devices and one on drugs. I think the drug committee was the czar for ophthalmology. Walter Stark was asked to be chairman. The committee called the lens implant a drug instead of a device just to get control of it.

Complications with the Intraocular Lens

Hughes: *In 1975, about ten years after the intraocular lens was first used in the United States, you and several associates began a trial of intraocular lens implants. Why did you decide to do that, and what was the result?*

Maumenee: It was because I saw all Norman Jaffe's implant cases and because Binkhorst claimed so few complications from his lens, which turned out to be totally wrong. His lens was awful. But it took about five years for it to rub on the iris and produce problems.

Hughes: *Did you pick up the problems in the study?*

Maumenee: Binkhorst never reported problems. We found them when we used his lens.

And Norman Jaffe never published his complications. I went to Norman who said, "You can go through my books and listen to my patients. None of them have any complications." I said, "Well, Norman, why are you changing from one lens to another if you don't have any complications?" He said, "Well, I thought that this was a better lens."

As I have mentioned, Walter Stark and I had kept a complete record of all of the patients in whom we had placed lenses. We tried to follow all of these patients at least once a year. We found a high percentage of both early and especially late complications, such as corneal edema and cystoid macular edema.*

Peter Choyce in England put solid lenses in the anterior chamber which always gave a lot of pain because they pushed on the iris in the chamber angle. Few people use his lens now.

We swore off anterior chamber lenses after we had bad results. Joaquin Barraquer had such terrible results from his lenses. He put them in young girls to correct their myopia.

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* Stark WJ, Maumenee AE, Datiles M, et al. Intraocular lenses: complications and visual results. *Trans Am Ophthalmol Soc* 1983; 81:280–309.
See also Smith PW, Wong SK, Stark WJ, et al. Complications of semi-flexible closed loop anterior chamber intraocular lenses. *Arch Ophthalmol* 1987; 105:52–57.

They got cataracts and corneal edema, and he had to take out most of the lenses. He swore he would never use lenses.

When I went over to Spain to receive the Barraquer Medal in 1987, I gave a lecture on posterior chamber lenses and tried to get him to use them, but he said, "No, I'll never do that again. I've blinded so many people by putting in those lenses." His lens was a good lens, but there is no good lens for the anterior chamber.

Hughes: *Why is that?*

Maumenee: Because it rubs on the iris and the back of the cornea. The irritation of the anterior chamber causes cystoid edema of the macula to develop. We don't know why.

I challenged Barraquer through his daughter Elena, who had trained in Boston. She came back to Spain and put lenses in and showed him how good they were, so now he is back in the lens business.

Uveitis

Uveitis and Tuberculosis

[Interview 6: October 15, 1991, annual meeting, American Academy of Ophthalmology, Anaheim, California]

Hughes: *Your first paper on uveitis was published in 1960.* Why were you interested in uveitis?*

Maumenee: Well, my interest in uveitis really was primarily because of Dr. Alan Woods. It was his claim to fame. Almost his entire practice was uveitis. As I mentioned, he called everything [causing uveitis] tuberculosis.

At a much later date, Norman Ashton was chairman of the centenary meeting in the United Kingdom of the British Ophthalmological Society. For that meeting, he assigned various people to look at where the subspecialties stood one hundred years ago. A lot of people had miliary tuberculosis with little nodules in the back of the eye, but they didn't get

* Welch RB, Maumenee AE, Wahlen HE. Peripheral posterior segment inflammation, vitreous opacities, and edema of the posterior pole. (Pars planitis). *Arch Ophthalmol* 1960; 64:540–49.

any chronic inflammation. But because tuberculosis was so prevalent and so many people had positive tuberculins [tests], Dr. Woods called everything tuberculosis.

Did you read my Jackson lecture?*

Hughes: *I did.*

Maumenee: It was picked by Dan Albert, who is very good on the history of medicine, as one of the classic articles in ophthalmology.**

Alan Woods and even Jonas Friedenwald said, "The eye can only react in a few given ways, so clinically you can't distinguish one type of uveitis from another." I disagreed, so I tried to break uveitis down into entities which I described in my Jackson lecture.

Hughes: *Why did you disagree?*

Maumenee: Primarily because I couldn't find the tubercle bacillus reported anywhere in the literature on uveitis. I couldn't find it in any of the hundreds of specimens I looked at from the AFIP [Armed Forces Institute of Pathology] and from our pathology lab. So it didn't make any sense to me that they were all tuberculosis.

Pars planitis is bastard or irregular Latin. It should be plans parsitis. We made the noun be the adjective because it sounded better. I didn't want to call it anterior uveitis the way [Michael] Hogan did. Schepens called it peripheral uveitis. It took years for ophthalmologists to change terminology and now, throughout the world, they all call it pars planitis.

Hughes: *Why did you object to the other terms?*

Maumenee: Because I didn't like to use a name that indicated that I knew where the inflammation was or what caused it.

I was criticized as "that stupid American who can't even get his Latin right." But if they had read the 1960 paper, I said on my first page in a footnote, "I am calling this pars planitis because I do not want to indicate that it is an inflammation of

* Maumenee AE. The 26th Edward Jackson Memorial Lecture. Clinical entities in 'uveitis': an approach to the study of intraocular inflammation. *Am J Ophthalmol* 1970; 69:1–27.

** Albert DM. Analysis of the *Archives*' most frequently cited articles. *J Am Med Assoc* 1988; 106:465–70.

the uveal tract, because it is not. Until we find the etiological factor and the pathogenesis, I would rather make it a distinct entity so that people can begin to look at what it is."*

Histologically, it is an inflammatory reaction around the blood vessels in the retina, and the inflammatory reaction is in the vitreous over the peripheral part of the retina, not even over the pars plana. It was a very distinct entity. You could see the "snowbank" by depressing the sclera in the area and looking into the eye with an indirect ophthalmoscope.

Mike Hogan claimed pars planitis was due to a worm, a nematode. A nematode and a number of other things produce a snowbank in the periphery of the fundus. But they are totally different from pars planitis. The worm looks like a white nodule in the periphery, but it doesn't spread all the way around the retina. Pars planitis is a very distinct entity and has been accepted as a distinct entity.

Hughes: *In the lecture you objected to the term uveitis itself and used "uveitis" in quotes all the way through the paper.*

Maumenee: That's right. Because 90 percent of the inflammatory reaction is not in the uveal tissue. For instance, pars planitis was not in the uveal tissue. Chris Zweng saw a patient who had pars planitis. They put her on massive doses of steroid, and she developed a fungal abscess of the brain and died, and we got her eyes for study. Histologically, the inflammation was in the vitreous overlying the peripheral retina, not even in the pars plana. Calling it pars planitis indicated that it was in the pars plana area. That's the area of the uvea anterior to the retina.

I inherited Dr. Woods's uveitis practice when I became chairman. I found an internist, Tom Van Metre, who I thought was very careful and good. I said, "Dr. Woods surveys patients and either they have positive tuberculin [tests], they have syphilis, they have arthritis, they have everything wrong with them, or they have nothing wrong with them. A survey on one patient doesn't mean a thing because a disease may affect the eye or it may not affect the eye; we have no way of knowing." The correct way to do a survey is to review a thousand patients. If one specific type of uveitis [inflammatory reaction] correlates in a higher percentage of systemic disease, then it is a very likely probability that the

* The actual footnote reads: "The term 'pars planitis' is used because it is a good descriptive term although its usage is not grammatically accurate."

systemic disease is the cause of that type of intraocular inflammation.

I sent all of my patients to Van Metre and told him he was not to look at the eye. He was merely to do all the tests and then come up with a diagnosis. Well, he got good enough at looking in with the ophthalmoscope and the slit lamp that he could make the diagnosis by the ocular findings, which loused up our double-masked study. But at least we were able to characterize histoplasmosis, which was what Dr. Alan Woods and H. E. Wahlen had first described clinically.*

When I was a resident, we had a big dining room where all the doctors ate. We were talking about uveitis. I said, "Why don't you find out how many people who have athlete's foot, dermatophytosis, also have uveitis. You'll find the highest correlation with uveitis of anything you can possibly think of because there are so many people who have fungal infections on the feet." [laughter]

Katy Borkovich, who was an internist, said, "Well, Ed, that's not too foolish. They now know that histoplasmosis has been mistakenly diagnosed as tuberculosis. It produces a lesion in the lung which looks just like tuberculosis. So I bet you that *Histoplasma capsulatum* [fungus] will produce an inflammatory reaction in the eye." I told one of my residents, Bob Day, about it, and Bob injected the *Histoplasma* organism into animals' eyes. Sure enough, it produced an inflammatory reaction in the eye. It looked just like the tuberculosis reaction.

Then Ron Smith took it up, and the whole staff went up to his hometown, Walkersville, Maryland, where they had a lot of histoplasmosis, and examined the entire population.**

We had an epidemiologist from the school of hygiene go with us, and he pointed out that there was a definite correlation between histoplasmosis and the specific little lesions that occurred in the uveal track. It hit the macular area and caused macular hemorrhage.

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* Woods AC, Wahlen HE. The probable role of benign histoplasmosis in the etiology of granulomatous uveitis. *Am J Ophthalmol* 1960; 49:205–20.
Meredith TA, Green WR, Key SN III, Dolin GS, Maumenee AE. Ocular histoplasmosis: clinicopathologic correlation of 3 cases. *Surv Ophthalmol* 1977; 22:189–205.

** Dr. Smith described this episode in an interview recorded on November 1, 1989.

Classification of Uveitis

Maumenee: Gradually, I was able to categorize uveitis as I did in that 1970 article. As I said, I don't mean to be critical of people like Woods and Hogan. We can see further into the distance because we stand on the shoulders of the giants of the past. That was a quotation Derrick Vail used and I gave him credit for it. I found out later that the quote was as old as Julius Caesar.

Hughes: *I have heard it attributed to Isaac Newton, but maybe it goes back further than that.*

How did your colleagues react to this more precise classification?

Maumenee: Well, I think a lot of them began to look at it. What I wanted people to do was to take fundus pictures of these various specific entities from around the world and do tests to show whether you had toxoplasmosis or not. But I could never get it done.

The International Council of Ophthalmology had a committee on uveitis. Terry Perkins, from the Institute of Ophthalmology in London, was on the committee. He was very interested in uveitis. He worked for a year with us at the Wilmer Institute. The committee broke down uveitis into anterior and posterior uveitis, and acute and chronic uveitis. This classification means nothing. It doesn't help you get anywhere when you could be basing the classification on these typical histologic pictures. I could look in the eye and say this is toxoplasmosis, and I would be right 99 percent of the time.

Hughes: *Does precise diagnosis lead you to a specific treatment?*

Maumenee: Yes. You have to recognize the entity. Then you have to break down uveitis into clinical entities because, just like macular degeneration, it may be caused by a lot of different things. Then you take each entity and see if you can't find some common systemic denominator. Your next step is to obtain histopathologic material which ophthalmologists were more backward in obtaining than any other specialty in the world.

Hughes: *Why?*

Maumenee: Because you can take a biopsy of the breast, you can take a biopsy of the colon, you can take a biopsy of the brain, you can

take a biopsy of practically anything except the eye. There was no way to take a biopsy of the eye during the acute stage of the disease. You could tap the anterior chamber, but the spillover of inflammatory reaction from the back of the eye would come in through the anterior chamber and would be either nongranulomatous or granulomatous. Most of the inflammatory reactions start out as nongranulomatous. When they become chronic, they become granulomatous—that is, they contain a lot of macrophages and lymphocytes and other cells.

I wouldn't accept the report on uveitis for the International Council of Ophthalmology, and I said, "This puts us back twenty-five years. There are plenty of diseases classified under uveitis that you should be looking at worldwide."

Hughes: *Did they modify the report?*

Maumenee: I think the whole world has swung to that. We already knew there were specific clinical types of ocular inflammations that were well described and classified, like sympathetic ophthalmia, Vogt-Koyanagi's disease, acute nongranulomatous iritis that occurs with arthritis, and Behcet's syndrome, which occurs in the Middle East and in the Japanese. But people called general uveitis simply anterior or posterior.

Hughes: *Why did you decide to give the Jackson lecture on uveitis?*

Maumenee: It was a subject I was working on at the time. The lectures that I gave throughout the years were on subjects that I was currently working on. If I couldn't make a real contribution, I didn't want to give the lecture.

The last entity that I described as a form of uveitis took five years to get into the ophthalmic literature. Steve Ryan and I called it birdshot choroidopathy.* Patients had little spots peppered all over the back of the fundus, and cells in the vitreous and whatnot. Since I'm a hunter, I thought the fundus looked like a bedsheet with holes from number nine shot.

At the National Eye Institute, there was a whole group of people who worked on autoimmunity. I sent some patients with the clinical picture of birdshot retinochoroidopathy down

* Ryan SJ, Maumenee AE. Birdshot retinochoroidopathy. *Am J Ophthalmol* 1980; 89:31–45. Nussenblatt RB, Mittal KK, Ryan SJ, Green WR, Maumenee AE. Birdshot retinochoroidopathy associated with HLA-A29 antigen and immune responsiveness to retinal S-antigen. *Am J Ophthalmol* 1982; 94:147–58.

to them because I was then out of uveitis. They found that a high percentage of the patients had antibodies to antigen S, which is a retinal antigen. Histologically, this was a disease that attacked the outer segments of the retina, producing a diffuse inflammatory reaction. They also did HLA [human leukocyte antigen] studies on it. The birdshot patients had HLA-A29 antigens as frequently as did those with Marie-Strümpell disease.

Immunologists' Interest in Uveitis

Hughes: *Were the immunologists taking any interest in uveitis? It seems to me you were showing that the eye is a wonderful way of visualizing inflammatory responses.*

Maumenee: Right. There were so many physicians that made mistakes by looking in the eye with the ophthalmoscope and thinking they knew what the basic pathology was, but they weren't pathologists and they never looked at any pathology. So they described what they thought the pathology was, which turned out to be wrong 90 percent of the time. Once you had looked at the clinical picture and then looked at the histopathology under the microscope, you could put the two together and do a good job.

Immunologists have shown some interest in some of the eye diseases. But eye diseases are so difficult to diagnose. Even Art Silverstein made some errors in nongranulomatous anterior uveitis. He showed that if he injected horse serum into the eye, after fourteen days the animal would get an inflammatory reaction. If a year later he injected horse serum into the eye, the eye would flare up immediately. Apparently, there were cells that remembered that they were allergic to horse serum and would flare up. So he claimed that this was the problem in anterior uveitis.

That didn't make any sense to me because every time we operated on a patient for cataract we produced inflammatory cells that participate in the healing process. If these people had allergies to anything, those cells would be there. For instance, if somebody was allergic to seafood, every time he ate seafood, he ought to get a flareup of his eye.

Hughes: *Did you argue with Dr. Silverstein?*

Maumenee: Yes I did, but I never wrote it up.

Histoplasmosis

Maumenee: Alan Woods, in his textbook written about a year before he died, had a beautiful picture of histoplasmosis with hemorrhage in the macula and scars around the optic nerve and in the periphery. He called it tuberculosis! This was a classic picture of histoplasmosis.

I sent Don Gass over to the AFIP [Armed Forces Institute of Pathology] to work with [Lorenz] Zimmerman, and he got interested in pathology. I said, "While you are over there, look up all the cases of hemorrhagic macular disease and see if you can't find the *Histoplasma* organism." He came up with one specimen with a granulomatous lesion in the macula area, but he couldn't find any organism in it.

Later on, I sent Steve Ryan to spend a year with Zimmerman. They stained the specimen Don Gass had found with a special stain. They found one organism that looked like *Histoplasma*. The doctor in Memphis had taken the eye out, thinking it was a melanoma. He was afraid he would be sued, so he wouldn't tell Steve where the patient was. The patient's name was Smith. Steve went through the Memphis telephone directory and called every Smith in the directory and asked if they had a son who'd had an eye removed for a tumor. He finally found the mother of this boy. The kid was in law school. Steve went down to Memphis, looked him up, looked in his other eye, and he had the typical punched-out lesions of histoplasmosis. The persistence to call every Smith in the Memphis telephone directory is typical of Steve Ryan. This patient has been one of the most frequently reported cases of histoplasmosis. There have been other cases that have been found since that time.

Eye Donation

Hughes: *At the end of your Jackson lecture, you urged ophthalmologists to ask their patients to will their eyes for research. Was that a crusade of yours?*

Maumenee: Yes.

Hughes: *Again, it was the theme of correlating the clinical and the histological picture.*

Maumenee: The theme of my research life was clinical-pathologic correlations.

Hughes: *Had others preceded you in that emphasis?*

Maumenee: I'm sure they did. [Ernst] Fuchs certainly made some very astute observations on various types of histopathology, and so did Verhoeff and Friedenwald. But I don't think any of them really went at it with the idea that they were going to look at the clinical aspects of a disease and then try to correlate them with the pathology. Once you got the pathology, you tried to get the etiology; and once you got the etiology, you tried to find the pathogenesis.

Hughes: *How successful were you in persuading your patients to donate their eyes?*

Maumenee: I would say we did fairly well. Certainly, Harry Quigley has done a much better job than I have. In his work on glaucoma and the pathogenesis of visual field loss, he would take visual fields and pictures of the fundus shortly before his patients died so that there was a really good clinical-pathologic correlation. He found that you could lose as much as 40 percent of your axons without losing any visual field in glaucoma, which was a very important finding.

One of the major problems he and others are working on now is how to determine the first manifestation of damage to the eye from glaucoma. Nobody knows today. Visual field testing is just not sensitive enough. Apparently there is a general loss of the large ganglion cells as the first damage to the axon from the retina. They decrease in one localized area more than in others, and that is why patients get a characteristic arcuate scatoma extending from the upper and lower poles of the eye. Those are the areas where I found the pits, as we published in the *British Journal of Ophthalmology*.*

Hughes: *What arguments did you find were successful in convincing patients to donate their eyes?*

Maumenee: I would say, "In medicine, we are not gods. We are just plain human beings. We don't know everything. In 20 percent of medicine we know what we are doing, and 80 percent is witchcraft. We just think we know what we are doing. The only way we will ever find out what the answers are in ophthalmology is to get fresh specimens of various lesions in the eye and to look at them under the microscope. We can't take a biopsy of your eye or we would ruin it. If you want to

* Radius RL, Maumenee AE, Green WR. Pit-like changes of the optic nerve head in open-angle glaucoma. *Br J Ophthalmol* 1978; 62:389–93.

do anything for humanity, will your eyes to the eye bank and say, 'For pathologic studies only. Not for corneal transplants.'"

It was amazing how many patients would comply. Some people would shudder and say, "You're not interested in me. You're just interested in me dying and getting the eyes." They would get all upset. But the majority were patients whom I had really worked with, and who realized that I had been interested in their disease.

I always believed in explaining to the patients for at least fifteen minutes what their problem was and whether or not we really knew anything about it. I said, "Even if we don't have any cure for your disease, if I can tell you what to expect in life, then you can plan your life better. If I know what's going to happen to you, even though I don't know why it's going to happen, it's going to be of value to you."

Hughes: *And patients responded to that line?*

Maumenee: They did. They said, "You're the first doctor who has ever sat down and really told me anything. Other doctors told me that they didn't know what the problem was and they didn't know how to treat it, and out the office I would go. Or they would give me some medicine." It's much easier to give a patient medicine than it is to explain their diagnosis to them.

Hughes: *How successful were you in persuading your colleagues of the necessity to make these correlations and to obtain specimens to examine?*

Maumenee: I think it spread. It is certainly not wholesale, even today. But there are certain people who have gotten some good specimens.

Bleeding Episodes in the Eye

Hughes: *Dr. Sears wrote that you emphasized, and I am quoting, "the sources and causes of a variety of conditions that led to bleeding, both inside the posterior segment and interior segment of the eye, and emphasized certain conditions underlying these bleeding episodes[,] such as xanthomas in childhood."* *

* Marvin L. Sears, MD, to Sally S. Hughes, PhD, October 26, 1989.

Maumenee: Actually, the first time a nevoxanthoendothelioma in the eye was described was by a dermatologist named Harvey Black. I saw this baby in Seattle. It had an anterior chamber hemorrhage from unknown cause and had a gray spot. I didn't know what it was. Then, at a Verhoeff Society meeting, Ted Sanders presented a case of an eye that had been removed because of a mistaken diagnosis of a tumor when it was a nevoxanthoendothelioma.

So I called up Carl Jensen, who was a good friend of mine, and asked him to take a biopsy, and he did, and it turned out to be a nevoxanthoendothelioma. I published that case, and after that I saw several other cases which I treated with radiation because the cells looked sensitive to radiation.* It cured them. Then Don Gass found out that you could get rid of the cells by putting cortisone in the eye, which is a much safer way of doing it.

Hughes: *Why would those cells be sensitive to cortisone?*

Maumenee: They were abnormal fibroblasts which were sensitive to cortisone.

I published that I thought that expulsive hemorrhages began as a serous exudate and that as the vessels were stretched and became brittle they would break and cause an expulsive hemorrhage.** If you sewed the eye up very rapidly when you saw things begin to come forward in an operation, and if you let the pressure go up, it would act as a tourniquet that would then stop the bleeding. You could proceed with the operation and come out with a perfect eye.

As I told you, I treated Coats's disease, which consists of dilated vessels in the retina. Exudate forms under them. I treated hemangiomas of the choroid. There is a condition called circinate retinopathy. It wasn't actually a bleeding disease, but it was written in the textbooks that macrophages phagocytized the dead cells and then they formed a white ring. That's why it was called circinate retinopathy. Using

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* Maumenee AE. Ocular lesions of nevoxanthoendothelioma (infantile xanthoma disseminatum). *Trans Am Acad Ophthalmol Otolaryngol* 1956; 60:401–405.
Maumenee AE, Longfellow DW. Treatment of intraocular endothelioma (juvenile xanthogranuloma). *Am J Ophthalmol* 1960; 49:1–7.

** Maumenee AE. Shearing lens implantation techniques and complications. In: Francois J, Maumenee AE, Esente I, eds. *Cataract Surgery and Visual Rehabilitation.* Proceedings of the Second International Congress on Cataract Surgery and Visual Rehabilitation. Milano, Italy: Libreria Scientifica gia Ghedini, 1982; pp. 433–38.

fluorescein, I showed that diseased blood vessels in the center of the area were leaking serum, which was absorbed, and leaving the lipid behind.* If you photocoagulated the diseased vessels, the lipid would disappear.

The analogy to that is arcus senilis, in which a lipid layer occurs around the periphery of the cornea. In a lot of people, particularly if they have high cholesterol and if vessels grow into that area, the lipid layer extends around those vessels and then comes back around the limbus.

I treated some cases of von Hippel-Lindau's disease which were actual hemangiomas of the retina out in the periphery that produced changes in the macula area for some reason. I have told you about the hemorrhagic detachments in the macula.

Hughes: *Were you treating these bleeding conditions with the photocoagulator?*

Maumenee: The xenon photocoagulator.

Hughes: *And then you moved to the laser when it came out?*

Maumenee: Yes.

Differentiating Nevi and Melanomas

Hughes: *Tell me about diagnosing melanoma.*

Maumenee: I argued with Zimm [Lorenz Zimmerman] that in making a diagnosis of melanoma it was the height of the melanoma, not the spread or the extent of it, that was important. I think that most people agree now that if a lesion is not more than two millimeters thick, it's probably not a melanoma; it's a nevus. We used to take out a lot of eyes with nevi rather than melanomas. I'm sure Meyer-Schwickerath and his group photocoagulated [so-called] melanomas with the xenon arc. Many of the pictures he showed were nevi as far as I was concerned; they weren't melanomas. He still got a death rate about the same as that after enucleation. The dermatologists used to burn off moles, and those people used to die like flies because the treatment stimulated a totally benign lesion to turn into a malignant one.

* Maumenee AE. Doyne Memorial Lecture. Fluorescein angiography in the diagnosis and treatment of lesions of the ocular fundus. *Trans Ophthalmol Soc UK* 1968; 88:529–56.

Hughes: *When you saw something that wasn't big enough to diagnose as a melanoma . . .*

Maumenee: We just took pictures of it.

I had something like ninety patients with large and small pigmented, flat lesions. Ed Tamler, a resident of mine, and I followed them for five years, and none of the lesions turned into melanomas. Then Ed got as many patients back as he could ten years later and still none of them had melanomas. But that didn't mean anything. I did not have enough patients to pick up nevi that turned into melanomas. As a matter of fact, David Knox followed a doctor at Hopkins for about eight to ten years with a typical nevus in the choroid. The patient was very apprehensive, so Dave took fundus pictures every three to four months. Finally the lesion grew rapidly. The eye was removed, and it was a malignant melanoma.

J. V. Thomas from Massachusetts Eye and Ear Infirmary in Boston went through our specimens at the Wilmer Institute and showed that the survival rate of patients who had small melanomas was much, much better than those with big melanomas.*

Keratinization and Vitamin A

Hughes: *I will quote again from Marvin Sears's letter about you: "He was the first one to demonstrate the importance of the gray line, that is the line between the skin of the outer lid and the conjunctiva . . . , showing that when the gray line was compromised a squamification or thickening of the cornea would result." ** Do you remember the so-called gray line?*

Maumenee: "Gray line" is not the correct term. I don't know what the thing is called. On the lid margin, just behind the ducts of the meibomian glands, the tissue is usually mucous membrane. Under certain conditions it undergoes transdifferentiation to stratified squamous keratinized skin. That keratinized tissue is very rough, very irritating. After radiation or Stevens-Johnson syndrome or a number of different conditions, for some reason or another the conjunctiva, which contains goblet cells and flat cuboidal cells, turns

* Thomas JV, Green WR, Maumenee AE. Small choroidal melanomas. *Arch Ophthalmol* 1979; 97:861–64.

** Marvin L. Sears, MD, to Sally S. Hughes, PhD, October 26, 1989.

into stratified squamous epithelium. This acts then like sandpaper. Every time you close your eye, it rubs on the cornea. Eventually, the cornea becomes vascularized and frequently becomes cloudy.

I wrote a paper describing some of the causes of keratinization* and a later one in which I described cutting out this stratified squamous epithelium and replacing it with a mucous membrane graft from the mouth.** Then about 1956 or so, there was a beautiful article written by Fell and Mellanby in the *Journal of Physiology*.*** They were working at the Strangeways Laboratories in England and found that if they took mucous membrane from the nose of chick embryos and put this in tissue culture that contained no vitamin A, the tissue would grow feathers and have stratified squamous epithelium. If they put vitamin A in the culture medium, the tissue would turn back into mucous membrane with goblet cells. If they took skin off the back of a chicken and put it in high vitamin A, it would become mucous membrane. When they put it into low vitamin A, it would become keratinized.

I have just written a history of vitamin A which goes back to 2000 B.C. The Egyptians would take the liver of oxen and squeeze the juice of the ox liver into the eyes of people who were night blind. It would cure their night blindness because they had had vitamin A deficiency. The liver contains large amounts of retinol.

There are 1,500 analogues known of vitamin A. Two of them have been worked out quite well. One is retinol, which is a breakdown of beta carotene. Carrots and green vegetables contain a lot of beta carotene. This breaks down into retinol which then forms the pigment epithelium of the retina. Retinol is the only vitamin A analogue that has been worked out in great detail. George Wald won the Nobel Prize for figuring out the exact chemistry of the breakdown.†

Then the other type of analogue is all-*trans* retinoic acid. All-*trans* retinoic acid is very unstable. It only lasts for a week or so. It is responsible for the development of epithelial

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* Maumenee AE. Keratitis secondary to keratinization of the tarsal conjunctiva. *Am J Ophthalmol* 1956; 41:477–87.

** Maumenee AE. Keratinization of the conjunctiva. *Trans Am Ophthalmol Soc* 1979; 77:133–42.

*** Fell HB, Mellanby E. Metaplasia produced in cultures of chick ectoderm by high vitamin A. *J Physiol* 1953; 119:470–88.

† Wald G. The photoreceptor process in vision. *Am J Ophthalmol* 1955; 40:18–41.

cells. So if you feed animals a diet that is deficient in all-*trans* retinoic acid, they come out with all kinds of defects.

Accutane (13-*cis* retinoic acid) for the treatment of acne in young people is an isomer of *trans* retinoic acid. An isomer is a mirror image of the normal product. It has exactly the same configuration. The body cannot metabolize the isomer. There were a number of young girls who were pregnant who didn't know it and they were taking Accutane. They had as many deformed babies as thalidomide caused.

Hughes: *But it didn't get quite the press, did it?*

Maumenee: It got a good bit. They then put a warning on the packages against taking Accutane during pregnancy. *Trans* retinoic acid is effective in stopping the excessive keratinization that plugs the sebaceous glands and causes acne.

Spectra Pharmaceutical Services, Inc.*

Maumenee: Scheffer Tseng, a Wilmer resident from Taiwan who had done a lot of tissue culture work with [Denis J.] Gospodarowicz in 1980 and 1981 at the University of California in San Francisco, repeated the work. He took the epithelium off the cornea of both eyes of rabbits and monkeys. In one eye he put vitamin A all-*trans* retinoic acid, and in the other eye he put a placebo. The eye with the all-*trans* retinoic acid retained conjunctival epithelium for two or three months afterwards, whereas the placebo eye underwent transdifferentiation into normal stratified squamous epithelium.

I had a young boy from Guatemala in whom I'd been grafting mucous membrane, but the grafts were thick and unsightly. I described his keratinization and named the different causes for it.** So I decided to treat this young boy with vitamin A on a compassionate basis. I told his mother that it was strictly experimental. Within two weeks his keratinization had cleared. He hadn't been able to open his eyes in the sunlight; he hadn't been able to read; he hadn't been able to get along. The keratinization disappeared. So I said, "Scheffer, let's run a compassionate study, a pilot study, on this."

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* Spectra Pharmaceutical Services was also discussed in Interview 7, on October 16, 1991. Segments from the transcript of that later interview are incorporated here.

** Maumenee AE. Keratinization of the conjunctiva. *Trans Am Ophthalmol Soc* 1979; 77:133–42.

You now have to contact the JCCI, the Joint Commission on Clinical Investigation, to get permission to run any kind of new study or new treatment of a patient. I had Scheffer submit to the JCCI for permission to do a trial, a pilot study. Tom Hendricks wrote back and said, "You'll have to get an IND, investigational new drug, first." That takes a lot of toxicology testing, a lot of other testing. It would have taken Scheffer at least six months to get the testing done, and he was leaving for Boston for a fellowship at the Massachusetts Eye and Ear Infirmary in July of 1984.

Enclosed with the JCCI's request for an IND were two copies of statements from the FDA that said if a drug had been used for one purpose and been successful and was not toxic or harmful, and it would not be toxic or harmful for another purpose, a physician could use it on a limited basis, on a compassionate basis.* I said, "Scheffer, we can't get the IND in time. Let's go ahead and treat a few patients." To my knowledge, we treated only about six patients. He treated a number more that he didn't tell me about. So it ended up that we published some twenty patients that we had treated as a pilot study.**

I started a company to make generic drugs for the eye because I thought trade name drugs or drugs that had patents on them were too expensive.

One of the things we put in our brochure when we went public was this remarkable thing of using all-*trans* retinoic acid. It cleared the keratinization up completely on the twenty patients in our pilot study. I got into massive troubles, all kinds of bad publicity. It was the worst thing I've ever had happen to me in my life. Because of not getting permission from the JCCI, Hopkins had a study on misconduct. They claimed that I, as principal investigator, had not supervised Scheffer as I was supposed to. I had not gotten an IND, and although there was no evidence of fraud or deceit or financial conflict of interest, that I had not followed the rules of the hospital, and therefore I was to be censured.*** I said, "'Censured' is too strong a word. I'd appreciate it if you'd say 'admonished.'" They did that.

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* "Use of approved drugs for unlabeled indications," *FDA Drug Bulletin* 12:1, April 1982. Copy on deposit at the Foundation of the American Academy of Ophthalmology.

** Tseng SCG, Maumenee AE, Stark WJ, et al. Topical retinoid treatment for various dry-eye disorders. *Ophthalmology* 1985; 92:717–27.

*** Richard S. Ross, MD, Dean of the Medical Faculty, Johns Hopkins, to A. E. Maumenee, MD, February 21, 1989 and March 7, 1989. Copies of correspondence on deposit at the Foundation of the American Academy of Ophthalmology.

As a result of some adverse articles in the lay press we were investigated by the Subcommittee on Oversight and Investigations of the House Committee on Energy and Commerce, the Maryland Medical Society Committee on Ethics, the U.S. Securities and Exchange Commission, the Massachusetts Securities Exchange, the National Institutes of Health, the Harvard committee on ethics, and the Johns Hopkins Medical School Committee on Misconduct. I can say that none of these investigations resulted in reported evidence of fraud, deceit, or financial conflict of interest on my part as far as I was concerned. In addition the American Academy of Ophthalmology committee on ethics, after examining the facts in this matter, took no action.

Spectra's I-Scrub

Maumenee: We made some unique products. We had one product, I-Scrub, that is just fabulous. We made it for the hygienic care of blepharitis, that is, clearing up inflammation of the lid margins. Although it has never been approved for other problems by the FDA, patients have used it successfully for a number of conditions. In culture, it kills all aerobic and anaerobic bacteria. It takes all the plaque off your teeth. I sent it to the University of Maryland Dental School and John Hassler, the assistant dean, had a bacteriologist check it against all the bacteria that cause gingivitis. It kills them all.

They wanted to do surgery on my teeth because I had so much plaque. I started brushing them with the I-Scrub, and it took all the plaque off completely. One of our technicians had to go every month to have her plaque scraped off. She started brushing her teeth with this once or twice a week, and she has no plaque anymore. Your teeth feel like you had just come out from the dental hygienist, they are so slick. There is no plaque whatsoever.

Hughes: *How did you get from blepharitis to plaque?*

Maumenee: Dick Giovanonni, our experimental pharmacist, was a really brilliant guy. We were using Johnson's Baby Shampoo to clean off the lid margins. So I asked him to look at Johnson's Baby Shampoo. He came back and said, "Ed, that's not a soap. That's a detergent."

So he made up a detergent of about ten ionic and anionic detergents which had a pH of 7.2 and was isotonic so it didn't irritate the eye at all. It cleaned silicone contact lenses that we were throwing away because they would get deposits

on them and turn white. We could just soak them in the detergent and it would take the deposits off. It has cured candida infections under the toenails; it's cured *Candida vaginitis*. It kills the trachoma agent. It kills the AIDS virus, which is easily killed, but the detergent is too toxic to take systemically. It kills the herpes virus. The herpes virus stays in the Gasserian ganglion and periodically comes out to the skin. If you feel the tingling sensation that you are going to get a breakout of herpes, you just put it on your skin three or four times a day, and the virus, when the virus comes to the skin, is killed.

Hughes: *Does anybody know how it works?*

Maumenee: They know how detergents work and they have been used to sterilize instruments and other things. But we have never taken that product through the FDA. We only took it through for blepharitis. But since a physician can use any therapy if it is safe, they have tried it on patients. We tried it in the laboratory first to see if it would kill viruses in epithelial tissue culture that wouldn't grow on anything else. It would kill the virus without killing the epithelial tissue culture.

Scientific Research and Financial Enterprise

Maumenee: Mort Goldberg, editor of the *Archive of Ophthalmology,* has accepted my history of vitamin A and is going to publish it in the *Archives of Ophthalmology.**

Hughes: *Does the history include your work on the subject?*

Maumenee: Yes. He has asked me to tell my side of the story of all the bad publicity I got regarding Spectra Pharmaceutical Services, Inc. and all the challenges.

There have been many, many articles in *Science* and other journals about the conflict of interest between basic scientists and the financial gain they can get out of the products that they make. This might influence the interpretation of their results. It might make them biased as to whether the products are good or not. This is not good.

* Maumenee AE. The history of Vitamin A and its ophthalmic implications. A personal viewpoint. *Arch Ophthalmol* 1993; 111:547–50.

Dr. Maumenee's Approach to Research

Hughes: *I've heard you called an idea man.* Please comment.*

Maumenee: Having an interest in pathology and some interest in virology and microbiology gave me a chance, when I would see something that nobody knew anything about, to fall back on those interests and make some suggestions as to what might be done. I've always said that anything that is written is believed. That's because only the monks knew how to write. Since the monks got the word from God, if they wrote it, it must be correct.

I never believed that whatever is written is true, so I questioned anything that didn't fit in with what I saw clinically. On the basis of that, I would have an idea of how to do some research.

Hughes: *So instead of accepting, you questioned. Then the next step was to test.*

Maumenee: That's right.

Hughes: *How open was your mind when you started a research problem?*

Maumenee: I always went at a problem by giving it the biggest overdose of whatever the drug was, the biggest chance to work. If that didn't work, then I thought probably the drug wasn't going to be any good. If that worked, then I would cut down [the dosage] to where there was less toxicity or less chance of getting side effects. If the drug still worked at a lower dose, it could be used. I used this technique in the allograft project. I transplanted big pieces of skin so the animal would be sure and get sensitized before I did the corneal transplant.

I always told every resident, "Look for something that nobody knows anything about. Your chances of making a breakthrough are much better than if you go for something that a thousand basic biochemists are working on."

Hughes: *It seems to me that you've done that on a number of occasions. You worked out fluorescein angiography in a relatively crude form, but then you didn't seem to be terribly interested in future refinements. Would you say that the joy comes from proving the initial idea?*

* Interview with W. Richard Green, MD, May 17, 1991.

Maumenee: Yes. I enjoy changing the concept that is generally held by ophthalmologists about a given disease or disorder. I used fluorescein angiography to learn more things about the pathology of the circulation. We couldn't take good pictures until we got a better photographer. I rigged up an indirect ophthalmoscope in which I knocked out the ground glass filter and inserted a cobalt blue filter. The light penetrating the cobalt blue filter would make visible the fluorescein flowing in the blood vessels of the retina and choroid. I could follow the fluorescein flares and see what was going on in the retinal vessels.

Hughes: *So you did refine the technique.*

Maumenee: Yes.

Hughes: *But not to the extent ultimately reached.*

Maumenee: That's right.

I think that different people have different minds. There are some people who really are students and learn a lot from books, and there are other people who have imagination and come up with new ideas. I think I am lucky to be one of the people who does a lot of things. I do things differently from other people because it doesn't seem to me logical to do them the way everybody else is doing them.

Hughes: *Do a lot of your ideas not pan out?*

Maumenee: Some of them. As Jonas Friedenwald told me, "If you can make one of your ideas out of twenty work, you are hitting a high mark. You get all kinds of ideas, but most of them are not going to work for you." I found that to be true.

Hughes: *Is it easy for you to release ideas when they don't seem to pan out?*

Maumenee: Yes. I don't feel comfortable publishing articles or continuing research about ideas that haven't panned out. I've done everything I could think of to make a perfect cut in the anterior capsule of the lens. I have used cautery. I had a resident who dropped out and is now working in electromagnetic fields. He said he could make a cutting electrode that I could use in the eye. It wouldn't heat up the aqueous. Gosh, we ruined more eye bank eyes and more rabbit eyes than you can think of, but we never got one to work.

Hughes: *The laser won't do that?*

Maumenee: The laser might well do it, but it would mean doing it the day before the operation or doing it downstairs and then having to take the patient back up to the operating room. We have a hand-held laser now, and maybe the thing to do is to take the hand-held laser up to the operating room and make the punctures.

Hughes: *Nobody has tried that?*

Maumenee: Nobody has tried that. The trouble is that when you make a puncture, the capsule sometimes spreads, and you can get a big opening. Other times you get just a little dot opening. So it's not controlled. It would be much better to have an electrode or a sharp knife or some other instrument which wouldn't make any traction but would cut the capsule.

We used the laser to open the posterior capsule, but it is on stretch because you've got the lens implant in. But sometimes you hit it and, bingo, you get a tremendously big hole. The next time you hit, you get a little hole. Maybe you can tune down the laser. It may be a good idea.

Hughes: *You might get something out of this oral history after all.*

Maumenee: Right.

Hughes: *Please comment on techniques and technologies as applied to research and surgical or clinical practice that have made a difference in your career.*

Maumenee: I have to say that I have made a lot of mistakes. If I didn't think of the idea myself, I always figured it was not good. I said to myself, "I can't do everything." So I just wouldn't adopt a new technique until somebody else had worked it out and I found it was safe and effective. Then I would jump on the bandwagon and we would try to do it better, do more cases, publish it more, and talk more about it.

Hughes: *What do you consider to be the major clinical and scientific problems in ophthalmology?*

Maumenee: I think the major problems in ophthalmology are conditions for which we have no therapy or that we can't prevent.

Hughes: *What are you thinking of?*

Maumenee: Senile macular degeneration, retinitis pigmentosa, glaucoma that we can't control, any number of congenital abnormalities.

The National Eye Institute

The National Institute of Neurological Diseases and Blindness (NINDB)

Hughes: *Do you know the origins of the NINDB?*

Maumenee: Yes. Mary Lasker was the wife of a big publisher and was extremely wealthy. Her husband died and she gave practically every politician that amounted to anything $5,000 a year for his campaign, so she was very popular in Washington. She lived in New York. She had a good deal of influence on starting some of the institutes in the National Institutes of Health. She was very interested in neurological diseases, so she started the Institute of Neurological Diseases. Then Mildred Weisenfeld, and Mary also, decided to add blindness to the title.

Hughes: *Was that their decision, with no pressure from the ophthalmologists?*

Maumenee: Yes. It was through Mary's political connections that this got done. I was on the council for the Institute of Neurological Diseases and Blindness, and I also testified before Congress from 1955 or 1956 for twenty-five years, primarily with the aid of Senator Lister Hill who was from Birmingham, a friend of my family. He took me around and introduced me to [Stuart] Symington and other powerful senators. I had taken care of Mark Hatfield's wife, who had recurrent erosion of the corneal epithelium. So I knew a fair number of senators. I didn't know as many people in the House.

Every year, when I testified, the chairman of the finance committee was usually the only committee member present. He was usually on the telephone talking to somebody all the time you were talking. He never listened to you. The staff made decisions. The staff runs Washington; senators and congressmen don't make the final decisions. Usually you have to go through a staff member, who is the guy behind the throne, to get to a senator.

Every year, Congress would raise the budget of NINDB. It would specifically say, "We are raising the budget so that

more money can go into research to prevent blindness." It would be turned over to the head of the National Institute of Neurological Diseases and Blindness. The neurologists would give the ophthalmologists 20 percent of the budget every year. That was it. So I said to the neurologists, "What is the justification for that? When I'm down there testifying to Congress for ophthalmology, I'm the only person they are listening to. They are not listening to the obscure, neurological problems you're talking about. They don't even know what you are talking about."

Hughes: *You were the only ophthalmologist to testify to the finance committee?*

Maumenee: Yes.

Founding the National Eye Institute (NEI)

Maumenee: The advisory board of NINDB is made up of heads of clinical and basic science departments. There were about twenty of us on the board. I went to a meeting and the professor of medicine said, "Well, you know the American Association of Professors of Medicine thinks *this* is the way it should be done." The chairman from surgery said, "The Association of the Professors of Surgery thinks *this* is the way it ought to be done." And it went down the line.

I thought, we ought to have an AUPO, an Association of University Professors of Ophthalmology. What's the best way to get it started? So I picked Dave Cogan, Mike Hogan, Bernie Becker, John McLean, Frank Newell, and myself to be the council of the organization. We met in Chicago and got caught in a snowstorm and no plane could get out. So that night we all sat around and talked about how AUPO could improve ophthalmology in the United States.

The question then came up: Shouldn't we see if we could get out from under the Institute of Neurological Diseases and Blindness and get a national eye institute started? So I went to Jules Stein because he had started Research to Prevent Blindness. Stein said he had made a major contribution to Nixon's campaign and thought he could use some influence to get an eye institute funded. He did a good job.

I went to Lister Hill and asked him what he thought. He said, "Well, Ed, it's going to be tough because [James] Shannon, the head of the National Institutes of Health, does not want to see NIH divided up into more institutes. It would

be impossible to run. So he is going to really fight you hard to keep a new institute from being founded. I don't know if we can do it or not. Let's see about it." Lister Hill did some very good work and got the bill passed in the Senate.

But the Senate cannot initiate. Bills have to be initiated in the House and then they go to the Senate. We got somebody to introduce the bill in the House.

Hughes: *[Fred B.] Rooney, who was a representative from Tom Duane's district in Pennsylvania.**

Maumenee: You're right; Rooney introduced it. Then we had to testify before the appropriations committee.

So Jules Stein went in and lied like a trouper. He said, "I'm a businessman. I've made half a billion dollars. I own Music Corporation of America. I've had everybody in Hollywood and every band in the country under contract. If you start this institute, I guarantee it will cost you less money, because we will be more efficient than if we stay under Neurological Diseases and Blindness." I thought, "God, that guy can lie his head off."

We [the National Eye Institute] now get $250 million a year instead of $20 million. Every year Congress upped us. Percentage-wise, we got a larger raise every year than any other institute of the National Institutes of Health, except cancer.

Hughes: *What do you attribute that to?*

Maumenee: Because with the help of Research to Prevent Blindness, Jules Stein's foundation, I testified before Congress. I had contact with a key person, Harley Staggers of West Virginia, who was head of the committee that brought bills like this to the floor.

Anyway, as soon as the bill came out of committee, it went right through the House. Then Lister Hill got it through the Senate. Shannon said, "Those dirty bums, they didn't say a word to me and they did all this behind my back. They had all the senators and congressmen in their pocket before I could get to them. Before I could get prepared, they had gotten an eye institute."

We had to have a head of the eye institute. Irv Leopold had agreed that if we got an institute, he would be the head of it.

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* For more on NINDB and the foundation of the National Eye Institute, see the oral histories in this series with Dr. Duane, pp. 103–108, and Dr. Cogan, pp. 126–128.

Hughes: *That was arranged beforehand?*

Maumenee: That was arranged when we went down to the [annual meeting of the] Association for Research in Vision and Ophthalmology [ARVO].

The strange thing was that there were a number of ophthalmologists who were very much opposed to creating an eye institute.

Hughes: *Why?*

Maumenee: They said, "We've got a good, secure thing [NINDB]. The neurologists are taking care of us very well. You don't know if you are going to get any money. You don't have a director. You don't have any way to run it." As a matter of fact, I tried to get ARVO to vote to have an eye institute and they wouldn't do it.

Hughes: *Why?*

Maumenee: They said they wanted to stay with neurology. Maybe it was the neurophysiologists who wanted to stay with neurology. I don't know. But anyway they wouldn't do it.

Hughes: *What about the Academy?*

Maumenee: I don't think the Academy backed it either. We had very little backing from the various associations. The AUPO [Association of University Professors of Ophthalmology] backed it completely.

Hughes: *The AUPO had been created in part to endorse an eye institute.*

Maumenee: That was one of the first things AUPO wanted to do. It was before the Academy broke away from otolaryngology.

Hughes: *Oh yes. The Academy didn't become independent until 1979, and NEI was formed in 1970.*

Maumenee: Then maybe the Academy wasn't very strongly behind NEI because the otolaryngologists didn't want us to have an institute if they did not have an institute. As I recall, we got very little support from the Academy, and the AOS [American Ophthalmological Society] wouldn't have anything to do with it at all.

Hughes: *The Academy in those days maintained that it was not a political organization, that it was an educational organization. They may have stood on that point.*

Maumenee: Yes.

Then we went through several people who declined the directorship. Carl Kupfer, who was chairman at the University of Washington in Seattle, applied for the job. Carl did a great job. He is now the deputy director of the National Institutes of Health. He was named the best director of any institute in the National Institutes of Health after his second or third year there.

Hughes: *About the time the institute was formed in 1970, the government began to cut back on its grants. Do you remember funding being a problem?*

Maumenee: It really wasn't. Congress gave us $20 million right off the bat.

The National Advisory Eye Council

Hughes: *You were on the National Advisory Eye Council, serving from 1969 to 1970 and then again from 1974 to 1978. Is there anything that you would like to say about those terms?*

Maumenee: No. The staff runs the advisory council. We would vote for something and then the staff would do what they thought was right.

Hughes: *Oh really? [laughter]*

Maumenee: We really didn't have much say. We would make suggestions, but by and large the staff took the council's advice and ran it the way they thought the council's ideas could be best accomplished.

Hughes: *The staff being Kupfer et al.?*

Maumenee: Kupfer. And Carl picked out the best people—Ed McManus and then another guy who became the deputy director of the National Institutes of Health. They did a great job.

Hughes: *What was the attraction to a government job?*

Maumenee: Permanent pay. You're a civil servant. You can't be fired. None of these people were physicians [except for Carl Kupfer]. They were administrators.

Hughes: *What is the National Advisory Eye Council supposed to do?*

Maumenee: It is supposed to look over the budget and plan how the money is spent and distributed.

We kept harping that there was not enough money going into clinical research. It was all for basic research because when a problem concerning clinical research would come up, everybody would be critical of it—they could do it better. They would give a high rating to basic research that they didn't know much about. But anything that was clinical that they knew about, they always had some correction on it. So we just couldn't get any money through for clinical research.

Hughes: *Do you have anything more to say about NEI?*

Maumenee: Mary Lasker was very complimentary to me. She said, "You're the best politician I know in Washington. You know everybody there. You can do anything you want to. You've got money now for research, but you don't have any buildings or facilities. You should get money for buildings."

Senator Fritz Hollings from South Carolina is a delightful guy. He has been to my house with his wife, Peaches, a number of times for dinner. Whenever I had an important foreign visitor at Wilmer, I would invite him to dinner with him. I told Fritz that Mary Lasker said we ought to have money for a building. He said, "Okay, I'll get it."

I got a lot of flak from the people doing research in the basic sciences. They said, "They will take the money away from basic science research and put it in buildings." I said, "No, this will be additional money I will get for you." But they didn't believe it, so they fought it like everything. The finance committee added money to our [NEI's] budget specially for a research building. This was done primarily by Fritz Hollings. Now they think it's the best thing in the world. Everyone is applying for it. [laughter]

VII. ACTIVITIES IN OPHTHALMOLOGICAL ORGANIZATIONS

International Congress of Ophthalmology

History

[Interview 7: October 16, 1991, annual meeting, American Academy of Ophthalmology, Anaheim, California]

Maumenee: This is a good time to record what I can remember of the history of the International Congress of Ophthalmology. The first congress met in 1857 in Brussels. It was an outgrowth of the German Ophthalmological Society and met irregularly and without any particular organization. During World War I, they had no meetings. The membership was almost 100 percent European because it was difficult to travel from the United States to Europe.

The congress was so poorly organized that in 1927 they developed an international council [International Council of Ophthalmology] to be the governing body for the congresses and for the federated societies. The federated societies have representatives from, I think, seventy countries around the world now. Then they began to have international congresses on a regular basis every four years.

The international congress was a good social meeting, but the papers usually didn't get printed until after the publication of the proceedings. A lot of people didn't turn papers in on time,

and then it was usually a year or two years before the book came out, so that nothing in it was really red hot and new. So nobody really gave their best papers at the meeting.

They then established several committees and wrote up a constitution and bylaws which have been changed two or three times. There were ten regular members, plus the president, the vice-president, the secretary, and the treasurer.

Hughes: *Who were elected?*

Maumenee: Who were elected via the council. Then they were approved by the federated societies.

Hughes: *How was the council appointed?*

Maumenee: The council members were the most powerful and best-known people in ophthalmology. They established committees on various topics, such as the fight against trachoma, visual driving safety, and ophthalmological education. Then they had the International Agency for Prevention of Blindness. None of these committees were very active. They would meet once a year and give a report to the federated societies every four years at the international congress.

To be on the council was the highest honor you could get in European ophthalmology. In the United States, most ophthalmologists had never heard of the International Council. They did have one person from the States, [George E.] de Schweinitz from Philadelphia, on the first council in 1927.

There was a meeting in New York in 1876 and another in Washington, D.C., in 1922, which they didn't call a regular congress. They called it something else; I don't know why. Those were the only congresses held in the United States until 1954, when they had a joint meeting with Canada and the United States because the United States, on account of the Cold War, wouldn't let the Russian delegates come to the United States. But they could come into Canada, so half the meeting was in Montreal and half in New York City.

Hughes: *Is it still a very European-dominated group?*

Maumenee: Well, it began to expand. Sir Stewart Duke-Elder was really the dominating figure for a number of years. He wrote a charming booklet for the hundredth anniversary of the

council which gives the story of how the council was formed, who was on it, and all of the presidents and the secretaries.*

Sir Stewart Duke-Elder

Maumenee: Duke-Elder, as I say, ran the council. He was ophthalmologist to the queen. He absolutely ran ophthalmology after World War I with an iron hand. He totally dominated. He wrote *A System of Ophthalmology,* which consisted of about eight volumes of one thousand pages per volume. It was unbelievable. He claimed that he only slept two or three hours one night and worked all night the next night. His wife was an ophthalmologist and she helped him. He did a remarkable job, particularly in his younger years. He was a dynamic, beautiful speaker, world-renowned.

Hughes: *But you didn't always agree with him, as you said a couple of days ago.*

Maumenee: No, I didn't. If there were two sides, he always seemed to take the wrong side. We were good friends. He and Alan Woods were very good friends. He immediately became very nice to me. He was president of the International Council for three terms.

Hughes: *Each term being four years.*

Maumenee: Yes, it was quite a long time. They finally made him honorary life president.

Jules François

Maumenee: Then Jules François came along. Jules ran it the same way; he made all the decisions. He would say, "Okay, this is what the council says. Everybody in favor? Okay, that passes." They hadn't voted. Whatever he said went. Everybody loved him, and he went all over the place to every meeting.

I think François wrote something like 1,500 scientific papers and I don't know how many books. He had all these fellows working for him. They would write a paper and he would put his name on it. That was a European custom. The chairman's name went on any paper that came out of his clinic.

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* Duke-Elder S. *A Century of International Ophthalmology, 1857-1957.* London: Henry Kimpton, 1958.

Hughes: *Did his name come first?*

Maumenee: His name came first, and sometimes the name of the person who did the work wasn't even on the paper.

Hughes: *It was good science?*

Maumenee: It was very good science. He was without question the leading ophthalmologist in Europe.

Dr. Maumenee's Offices

Hughes: *According to my notes, you joined the International Council of Ophthalmology in 1972.*

Maumenee: Yes. Duke-Elder said, "Ed, you are the president of everything in the United States, but you are not international. You should be international." Derrick Vail said the same thing. I think Derrick Vail became president of the council in 1966. He was a very close friend of Duke-Elder's. So they prevailed upon me to take the first vice-presidency of the International Association for Prevention of Blindness and promised me that I wouldn't have any work to do.

[Adolph] Franceschetti died two or three months after I took that job, so I automatically became the interim president [in 1968]. I then went on the council because I became president of the Pan-American Association. Then I was elected a regular member of the council. I was president of the International Congress of Ophthalmology in 1982, so that put me on the council for another four years. Then I became president of the council in 1982 which gave me another eight years. So I've been on the council for a long, long time.

Hughes: *Was the council an effective body when you joined it?*

Maumenee: They were not doing as much as they should. We had been the representative body for the WHO [World Health Organization]. WHO said, "Look, you're not doing anything to prevent blindness. So unless you start doing something on prevention of blindness in the developing countries, we will choose some other body to represent the ophthalmologists."

In the meantime, the International Association for Prevention of Blindness that I took over didn't do anything. They met periodically, and they had a journal published on the cheapest

paper you ever saw in your life and papers so out of date that it was awful.

I went over to Amsterdam as the successor to Franceschetti in 1968. They didn't let me in as an ex-officio member but as an interim president because I was first vice-president when Franceschetti died. I told them that I thought the organization should be disbanded. It didn't do anything. It hadn't done anything. Unless they put some money into it and did something viable, they ought to get rid of it.

Hughes: *What was the reaction?*

Maumenee: In the European tradition, if the chairman of the department said something, you never disagreed with it. They were absolutely floored that a squirt my age would tell them what to do. Queen Juliana had invited them to dinner at the palace. They wouldn't invite me because I was not a full-fledged president of the association.

Hughes: *Were you offended?*

Maumenee: I got on the plane and flew back to the States. I think I flew over in the morning and came back in the afternoon.

I held several meetings of the association and then they let me come on the council as an ex-officio member. We had a meeting in Paris in 1971, and John Wilson, who was blinded at thirteen, was there. He went through law school and graduated with double honors, which is the top honor you can get at Oxford. He became a very successful barrister in London. During the war he heard of many blinded soldiers and started the Commonwealth Society for the Blind. He did such a good job that it was made the Royal Commonwealth Society for the Blind. He collected about 5 million, and the pound was worth five dollars at that time, so it was quite a large sum of money.

John suggested we combine the International Association for Prevention of Blindness and the World Council for the Blind and call the organization the International Agency for the Prevention of Blindness (IAPB). I insisted that John should be the president since he led the Royal Commonwealth Society for the Blind and had the money to make this an active organization. Besides, he was the best person in the world to run the agency.

Changing the International Council of Ophthalmology

Maumenee: We had a meeting of the council in Kyoto in 1978. My secretary did not realize the dateline between the United States and Japan, and I was a day late because of the change of time. They were very upset because they had planned to nominate me for the presidency but I wasn't at the meeting. They nominated Jules again, so he was president for twelve years.

Hughes: *Why had they chosen you?*

Maumenee: I had been very vocal and active in making suggestions and was vice-president. Jules consulted with me on the people we should put on the council. I, of course, appointed my friends, who I knew were good.

Hughes: *Did you appoint Americans?*

Maumenee: Yes, Americans and Pan-Americans.

Hughes: *So you were changing the complexion of the council?*

Maumenee: That's right. Since I had been so involved in political activities in ophthalmology in Latin America and the United States, I had a lot of experience. By that time, I had gone to Europe quite frequently to give lectures in one place or another, so I knew a lot of the European ophthalmologists. Having been on the council, they elected me president.

Hughes: *Was there any resentment that the organization was becoming a more truly international group rather than mainly a European society?*

Maumenee: Well, they never expressed it to me, Sally.

The council became more of an international organization, but it still wasn't recognized very widely and it still didn't have any plan of action. So when I became president, I tried to change it by rewriting the bylaws and attracting young people. I was going to call it the Young Advisory Committee, but it turned out that most of them were in their forties and they didn't think they were young anymore. They came up with some really good ideas about how we should do things.

We made every effort to bring the Chinese and the Russians in. The Russians wouldn't join. The Chinese joined, but they

wouldn't allow us to fly the flag of Taiwan, so they [the Chinese] said they wouldn't come to the congress. So we didn't put any flags up at all. We got people from Hong Kong to give money to transport the Chinese delegation. It was in 1982 that the Chinese first came. We provided them with free hotels and spending money.

Hughes: *Why wouldn't the Russians come?*

Maumenee: Russia was very secretive and claimed it couldn't afford to get the currency. Rubles weren't allowed to go outside the country.

After the breakup of the Soviet Union, I got a letter signed by Y. F. Maichuk, N. M. Logia, Michael Krasnov, E. S. Avtisov, and N. Puchkovskaya asking if they could become members of the federated societies. I had a talk last night with Maichuk. He said, "You have been the rock that has held us together and brought us into the federated societies. We want to be part of the world now that the Soviet Union is no more." So they're going to join.

Honorary Life President

Maumenee: After eight years as president of the council, I said that no one should be president for longer than that. People become stagnant and don't get things done, so you ought to change officers.

Hughes: *You were made honorary life president of the international council in 1990. Only two other people had received that honor, Stewart Duke-Elder and Jules François. How was the decision made?*

Maumenee: They [the members of the council] came to me and said, "You don't have any prejudice. You are for everybody and you have the personality to convince people to do things. We want you to stay on as president. The council will drift back into doing nothing if you don't stay on and keep pushing it." So I said, "I really don't think it's right. My age is advancing, and who knows when I am going to become senile. I think I should resign while I'm still active and turn the presidency over to somebody who can continue this program." They said, "Well, we want you to stay on the council, so we'll make you an honorary life member so you can attend the meetings." In 1994, about six of the ten people who are on the council are going to retire. I am going to try and put some really good

people on, especially younger members who will do more things.

Hughes: *Do you think you have the pull to do that?*

Maumenee: I think the friends I've appointed will do what I ask them to do.

Prevention of Blindness Programs

Hughes: *You were president of the council from 1982 to 1990. Did you assume the presidency with specific goals in mind?*

Maumenee: Yes, at every congress we had a major session on prevention of blindness, which was a major theme of the congress. We also put up signs for people to volunteer to go to foreign countries to help them do cataracts and teach.

Hughes: *Did they?*

Maumenee: Yes, they did.

The international council has a booth here in Anaheim at this annual meeting, and it has presented a major paper on prevention of blindness. The council became quite a bit more active in promoting and supporting restoration of vision and prevention of blindness.

We started a program in Accra, Ghana, to teach people both extracapsular and posterior chamber lens implantation. You had to hog-tie the Africans to bring them in to do cataract extractions on them because the surgeons did intracapsulars and patients lost their glasses so they couldn't see any better after they were operated on than they could before. They would get retinal detachments and other problems and they would become totally blind, whereas they had light perception or hand-motion vision before the extraction. But once we started putting lenses in, there was a long line to get into the clinic to be operated on.

We wanted to teach. I went to Frank Winter, who was a former resident of mine, who had done superb work in Botswana and had moved to Upper Volta [now called Burkina Faso], where he had trained ancillary help to the extent where they could make a living taking care of patients. They were self-sufficient and they could teach. They could help the ophthalmologist.

Frank did a great job in these countries. He went over for six months with his family to these places as a representative of the Christian Eye Ministry. By that time, I had become friendly with Akef El Maghraby of Saudi Arabia and HRH Prince Abdul Aziz Ben Ahmed Ben Abdul Aziz Saudi. Through the Saudi Eye Foundation they agreed to give us $2 million to build an eye hospital in Accra. The minister of health, the president of the university, and all fifteen ophthalmologists in the country were 100 percent behind this program.

Then Frank's secretary made the mistake of sending a letter from Frank with the Christian Eye Ministry logo on it. They said, "This is just a sham to convert Muslims to Christianity." So they turned us down completely. We have not been able to get the money from anybody else.

Three hundred ophthalmologists signed up in Singapore to work abroad, even though the booth for registration was hidden. A lot of young people are interested in serving, some of them for the experience of doing a lot of surgery. We don't want them, we want experienced people. We screen everybody before we send them over.

Jerusalem Seminar on the Prevention of Blindness, 1971

Hughes: *Sir John Wilson wrote a wonderful letter to me in which he mentioned meeting you in Jerusalem. Was that the Jerusalem Seminar on the Prevention of Blindness in 1971?*

Maumenee: That's right.

Hughes: *He said that you and he conceived of a global strategy for the prevention of blindness.*

Maumenee: He is very generous. Isaac Michaelson was an English ophthalmologist. After England and the United States took land from the Palestinians for the Jewish homeland, Isaac joined the Israeli army and did a great job. He was very capable and a very wonderful man, so he was made professor of ophthalmology at the Hadassah Eye Hospital.

Michaelson held a congress on prevention of blindness in 1971. He had been sending his residents to Africa to operate. It was a very good congress and [there were] a lot of good papers. Sir John and I were staying in the same hotel. After

a dinner party he said, "Will you help me home tonight?" So I took him to his room. He said, "Don't bother to turn on the lights. I can't tell whether they are on or not."

The next morning I went by to pick him up to take him to the meeting, and he said, "You know, Ed, I had a few too many drinks last night and I couldn't sleep very well, so I wrote a draft on prevention of blindness. It's in Braille, but let me give it to you to see what you think of it." Gosh, it was exquisite. So he presented that draft the next day.

Hughes: *What was the gist?*

Maumenee: That we should organize and get more ophthalmologists involved in combatting blindness, that there were a great number of blind people who could be helped. At the time, he was arranging cataract camps which were responsible for 100,000 cataract extractions a year in these developing countries. He said it was a joint report that the two of us had written, but I didn't do anything.

Hughes: *Was it implemented as he conceived it?*

Maumenee: None of these proposals get completely implemented. There are very few people like John who are willing to buy trucks and to go out into the woods and find people with cataracts. They won't come in independently; you have to go get them to operate on them. John was and still is the best. He was knighted by the queen for his great work and now is Sir John Wilson. As wonderful as Sir John is, he could not have accomplished all he has without the help of his wife, Jean.

Hughes: *I heard that there was, or perhaps still is, a controversy over whether to do intracapsular or extracapsular cataract extractions in developing countries.*

Maumenee: That's true. I felt very strongly that the patients should have extracapsular cataract surgery with posterior chamber lens implants because then they could see right away. Instead of having to drag people in for operations, they line up early in the morning and beg to be operated on. You have to operate on just one prominent person and have him walk around seeing again, and the word spreads like a drum roll.

I feel very strongly that local ophthalmologists can be taught how to do extracapsular cataract surgery in a month or so. Insertion of the lens is the simplest thing in the world to do. If you train ancillary help to put the sutures in, patients

might have a fair amount of astigmatism because the sutures aren't tied quite right, but it wouldn't really make that much difference. They'll see much better, and they won't have to wear glasses. All they need to see is the rear end of an ox to plow the field.

The prediction is that by the year 2000 most of manufacturing will be done in the developing world because they have so much cheaper labor and we can put factories over there and automate them. They are going to have to have better vision to be able to do that.

International Agency for Prevention of Blindness

Hughes: *Do you want to comment on the International Agency for Prevention of Blindness?*

Maumenee: That's really gone over tremendously well. John Wilson was president for eight years. It's a much more active body than the council. They have established camps and organized prevention of blindness societies and whatnot.

Carl Kupfer was president next. He also did a very good job, and he had the financial backing of the National Eye Institute. So he could travel and put money into research in various places.

Hughes: *I read that you and Sir John composed the first resolution on blindness that was put before the World Health Organization.**

Maumenee: Yes. After we put the two organizations together [the International Agency for Prevention of Blindness and the World Council for the Blind], John said, "We ought to get a resolution from the World Health Organization that blindness is a really important problem." John wrote out the resolution and got the representative from Malawi to agree to make this proposal at a meeting of the World Health Organization [WHO] in Boston. John then suggested that I go to Boston and help to get the resolution passed.

It turned out that the presiding officer for the meeting was a friend. He ran for the Tulane track team when I ran the mile for Alabama. So I went to him and said, "Look, would you allow this to come to the floor?" I sat through three days of the assembly members arguing about whether drugs should

* Alfred Sommer. Contributions of A. Edward Maumenee to international ophthalmology and the prevention of blindness. *Am J Ophthalmol* 1979; 88:293–95.

be labeled such and such a way and whether Italian drugs were fit to use and all kinds of other things that went on in the WHO. Finally, he recognized the representative from Malawi, who presented a resolution that blindness was one of the important problems in developing countries.

It became one of the four or five major goals of the World Health Organization. They started with an ad hoc committee on the prevention of blindness. I was on the committee and I went down to Ouagadougou, Upper Volta. When I was there, I said that I had been active in trying to get the World Health Organization to recognize blindness as an important problem, but I had really never done any field work. So I felt that I should resign from the committee and that they should bring somebody else on. The other people who were on the committee, who weren't really doing field work, ought to get off and bring in the people who were serving camps and doing surveys and studying onchocerciasis and whatnot.

Controlling Onchocerciasis

I had met Bob McNamara, the secretary of defense, through Agnes Meyer, who owned the *Washington Post* and Atlas Chemical. I got a call one day saying, "Ed, this is Bob." I said, "Bob who?" "Bob McNamara." "Yes, sir. What do you want?" I wasn't a close friend, but I had seen him several times. He played squash with a urologist who had been a very good friend of mine while I was a resident at Hopkins, so we had something to talk about.

He said, "If you can cure onchocerciasis, I'll pay for it [with funds from the World Bank, which McNamara then headed]. I don't give a damn about medicine, but the Upper Volta is the most fertile land in the world and it could feed half of Africa. But they all go blind from onchocerciasis that is carried by the *Simulium* fly." So I said, "Okay, I'll try to do something."

So I went to the meeting in Geneva [the Ad Hoc Committee on the Prevention of Blindness] and talked to Mahler, who was head of WHO, and said, "Look, I don't know whether it is really true or not, but Bob McNamara called me and said that if you could get rid of onchocerciasis, he would pay for it." Sure enough, they started spraying with nontoxic materials to get rid of the fly. They reduced onchocerciasis quite a bit.

Then the drug Ivermectin, which veterinarians had used in animals for a long time for worms, was tried on humans. The

veterinarians did everything they could to block use of the drug in humans because they were afraid of adverse reactions causing its removal from the market, because it was so good for their animals.

Now they are really on the way to wiping out onchocerciasis, which was one of the three major causes of blindness in the world. It's not only in Africa but in South America and some other parts of the world. The drug is made by Merck Sharpe & Dohme which gives it free for the treatment of onchocerciasis. The IAPB plans to give Merck a plaque in recognition of its contribution.

Hughes: *Trachoma, I assume, is one of the three. What is the third one?*

Maumenee: It was trachoma, onchocerciasis, and keratomalacia. The latter is due to a vitamin A deficiency. Really, when you get down to it, cataracts are now the most frequent cause of blindness, because the other conditions are all curable.

Pan-American Association of Ophthalmology

Hughes: *I read that you attended the first meeting of the Pan-American Association of Ophthalmology in Cleveland in 1940.**

Maumenee: The AMA was having a meeting in Cleveland. A group of people from the section for ophthalmology, primarily Harry Gradle from Chicago, Connie [Conrad] Berens from New York, and Moacyr Alvaro from Brazil, decided that there should be a Pan-American meeting so that people from the United States would become more friendly with the Latin Americans. I signed up and became a charter member of the Pan-American in 1940. I didn't go to any meetings. The congresses were primarily social. They weren't very educational.

In the 1950s, there was a secretary for affairs in the United States from Chicago by the name of Allan. He called me one night and said, "You have been elected assistant secretary treasurer for America for the Pan-American." I said, "Look, I'm not even a member." I had forgotten I had signed up in Cleveland. He said, "We realized that the only way we could make you active was to make you an officer."

* Boyd BF. A. Edward Maumenee and Pan-American Ophthalmology. *Am J Ophthalmol* 1979; 88:293.

Moacyr Alvaro Fund

Maumenee: I went to the meeting in Santiago, Chile, which I think must have been 1954 or 1955, and that's where I met Ben Boyd from Panama. We then went with Brittain Payne from New York, who was active in the Pan-American, to visit Moacyr Alvaro, who lived in São Paulo. We visited the coffee plantations. The organization was very loosely run and they didn't have any money. Moacyr had a stroke shortly after that. I decided we should start the Moacyr Alvaro Fund so people from Latin America could come to the United States on a fellowship.

I wrote a letter every year to every ophthalmologist in the United States who was a member of the Pan-American, asking him or her to make contributions. We built up a couple of hundred thousand dollars.

When I retired in 1986, Bill Connor took over the presidency, and now the Pan-American charges ten dollars to every person who signs up for a congress. The money goes to the Pan-American Foundation for fellowships and to promote teaching.

Then I got the idea of having visiting professors go from the United States to Latin America and vice versa for a month or more. Two or three would give a series of lectures and show movies about new techniques. The visiting professor program became quite popular from an educational point of view.

Benjamin F. Boyd

Maumenee: In 1958, Alvaro died, and I thought, "Who would be the best person to run the Pan-American?" We picked Ben Boyd because he was from Panama, which made him centrally located, and he was totally bilingual. Ben really worked at this. He started writing the *Highlights of Ophthalmology,* which turned out to have the largest circulation of any ophthalmic journal in the world. It's translated into Spanish, German, French, and Chinese.

He would go to a meeting, take the biggest hotel suite, stay in his pajamas all day, and interview people who were leaders in glaucoma and cataract and uveitis and whatnot. He really became superbly efficient at his interviews. He got excellent material. The reader got this material in *Highlights* before it was ever published elsewhere.

Working very closely with Ben, I became his advisor on many things. A lot of the changes that we made in running the

Pan-American were things that I thought of. Being head of organizations in this country, I knew how they were run, and I put that knowledge into effect in the Pan-American. I have been on the council for I don't know how many years [since 1967].

The Pan-American certainly honored me. I got the Gradle Medal for Teaching [1979] and was president from 1972 to 1975. Ben and I have been close friends since the 1950s and have worked closely together for the betterment of the Pan-American.

Ben was a wonderful executive. He alone brought all of the Latin American countries into the Pan-American, a task which was not easy when one considers the diverse attitudes of these countries. Ben really made the Pan-American what it is today. They honored him by establishing the Benjamin Boyd humanitarian award to be given to the person who has done the most to promote education and fellowship amongst the ophthalmologists in the Americas. Ben received the first award.

American Academy of Ophthalmology

Palmer House Days

Hughes: *What are your memories of your first annual meeting of the Academy?*

Maumenee: I really can't remember my first meeting. I know it was while I was a resident because it was when I got infected with streptococcus, when I was working on chemical warfare. Except during the war, I attended every annual meeting each year. The first activity I really had with the Academy was a course on cataract surgery that John McLean, Jack Guyton, and I gave, which I told you about. It was the first course sold out for fifteen years. I told you the story about the movie?

Hughes: *No.*

Maumenee: Every year, about fifty people gathered in a little room in the Palmer House. It was hot and stuffy and there was no air conditioning. We showed movie after movie after movie after movie. People would get sleepy and dull. So I decided I was going to wake them up. I got a movie of a girl doing a striptease on the side of a pool [laughter]. She stripped and just as she had turned her back and was taking off her last

clothes, I cut off the movie and spliced that part onto the end of my cataract movie.

Hughes: *I understand from Frank Newell that one of the attractions of that course was that you would debate back and forth with Jack Guyton and John McLean.**

Maumenee: We argued like mad.

Hughes: *And the audience loved it.*

Maumenee: That's right. In fact, Dr. Alan Woods encouraged you always to question everything he said and to argue with him. We were all three trained under Alan Woods. So we carried this arguing on back and forth.

Hughes: *Did the audience enter in at all?*

Maumenee: Oh yes.

But to carry that story on further, Connie Bricker, who was a good Catholic at Stanford, said, "I have to lecture to the nuns at my hospital. May I borrow one of your movies?" I said, "Yes, you sure can. But I don't have time to pick it out. The stack of movies that I have taken is over there." He unknowingly picked out this movie with the striptease on it and showed it to the nuns. He came back on Monday and said, "Ed, you son-of-a-gun. You almost got me kicked out of that hospital. I was showing that movie and here came the striptease. The nuns were absolutely shocked beyond words." [laughter]

Bill Benedict was a good friend of Alan Woods. Bill Benedict *was* the Academy. When he first started, probably 200 people came to the annual meeting. He organized a staff to run the Academy and built it up to where there were several thousand people who came to the annual meeting. We always met in the Palmer House. The Palmer House got so crowded that we couldn't all stay there. People had to stay in other hotels. The elevators were so full that you couldn't get up and down. Five hundred people couldn't get in to hear the main sessions because the auditorium wasn't big enough. So the Academy moved out of the Palmer House.

After a number of years, I was asked to become a councillor on the administrative board of the Academy.

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* Interview with Frank W. Newell, MD, October 29, 1989.

Hughes: *Your first office was in 1962, when you became a vice-president. In 1963, you became a member of the council.*

Maumenee: I went to Bill and I said, "Bill, I don't want this vice-presidency. That's the kiss of death. That means you've paid me off." He said, "No, that's just a stepping stone to the council. See how it goes." So I did, and then we had two ophthalmologists and two otolaryngologists, and the council made all the nominations for everything and passed them on to the president and to the executive secretary. The executive secretary ran everything.

Separation into Two Academies, 1979

Maumenee: The ophthalmologists got fed up working with otolaryngologists. There were only about thirty or forty members who were practicing both specialties, so we really had no reason to be affiliated with the otolaryngologists except that the eye is close to the nose and that was all there was to it. The otolaryngologists had developed a whole group of other societies, so they were very split up. The ophthalmologists had one main society, the Academy. The otolaryngologists spent about 60 or 70 percent of the money for otolaryngology, and ophthalmology put in about 80 percent of the amount of money. The Academy was primarily an academic teaching organization.

Hughes: *That was Bill Benedict's goal.*

Maumenee: Yes.

Hughes: *I understand that he was opposed to the Academy getting into politics.*

Maumenee: That's right. He wanted it to be a teaching organization.

Hughes: *How did you feel about that?*

Maumenee: I thought it was a good policy. Practically all of the people who were on the Academy board were from medical schools.

Bill appointed a committee and asked me to be chairman of it. It consisted of Derrick Vail and I don't know who the other ophthalmologist was. There were three of us ophthalmologists and then there was Leajune, who was an otolaryngologist, and Howard House, and somebody else, maybe Mike Kos. The six of us went to see Bill when he was not feeling well. He said, "It will just kill me if you split the

Academy. I've worked all my life to put it together. It is now a powerful political body, and you just can't split it."

There were never more than fifty to seventy-five people who came to the business meeting out of the thousands of ophthalmologists and otolaryngologists who came to the annual meeting. So it was kind of a farce. Nothing really happened. But Lawton Smith and J. V. Cassady proposed that we split. I convinced them that the Academy should not split until Bill Benedict passed away. He had made the Academy what it was, this was his life's work, and it would just destroy him to divide it.

So I came back from seeing Dr. Benedict and convinced the membership at the next meeting that they should not split.

Hughes: *Now was this in the sixties?*

Maumenee: Yes, it must have been. It was about two or three years later that Bill Benedict died [1969]. When he did, I went to Lawton and said, "Lawton, now is the time for the Academy to split. I'll tell all my friends to come to the business meeting, but they have to be sworn to secrecy." We rigged the votes. He and Cassady and several of the people rounded up as many ophthalmologists as they could to go to the meeting.

At that time Jules Stein was giving $25,000 as the Stein Award to the ophthalmologist who had made the most contributions to ophthalmology. He gave a reception afterwards. I was at the reception when I got word that Rene [Dr. Maumenee's wife] had just been taken to the operating room to have Niels. Dave Noonan got me a police escort and a plane ticket. I left immediately and got into Baltimore about one o'clock in the morning. Rene had had a caesarean by that time, and the baby was all right. But I wasn't there. I was there for the birth of our second child, Nickie.

Lawton brought up the motion at the business meeting, and they voted overwhelmingly to split.

Hughes: *Had you arranged with Dr. Smith to make the motion?*

Maumenee: Yes. I said, "Now is the time to make the motion to split." They made the motion and they voted. The ophthalmologists had packed the business meeting. The otolaryngologists were absolutely furious. They said that was the dirtiest low-down trick they had ever seen. They said, "You stuffed the meeting with ophthalmologists and didn't tell us anything about it."

Then they tried to get the vote rescinded, arguing that there were not enough members present for a valid vote. So we had to send out a mail ballot to see whether members wanted the Academy to split. Of course, the ophthalmologists all wanted to split. It was confirmed by the mail ballot that we wanted to split. The otolaryngologists used every political maneuver they could think of to reverse the vote, particularly Howard House, whom I respected greatly. He is a superb otolaryngologist. He used the rules of order to try to keep the organization together.

Hughes: *Why were the otolaryngologists so intent on preventing the split?*

Maumenee: Because they were getting money to keep them going. They had sixteen organizations and the Academy organization that was so well organized that it worked fine. Mike Kos did a good job as executive secretary during the split.

We went through some very rough, hectic times. It took two or three years before we finally got the lawyers to draw up a contract. There was a big monetary fund in Rochester with stipulations that Bill Benedict had made that it could never be split between ophthalmology and otolaryngology. So we had to break that law. There were all kinds of details that had to be worked out before we split.

When we got Bruce Spivey in as executive secretary, the Academy really took off. He did a superb job and really built it up.

American Association of Ophthalmology

Maumenee: Then there was the American Association of Ophthalmology that was strictly interested in the political activities of ophthalmologists.

Hughes: *Fighting optometry.*

Maumenee: Fighting optometry and all that. I went off the council and the Association wanted to merge with the Academy. I was opposed to it because I wanted the Academy to be strictly an educational affair. But times were changing, and the doctors in practice kept coming to me and saying, "Why doesn't the Academy protect us ophthalmologists?"

It was Brad Straatsma who worked out the union of the Association and the Academy.

Hughes: *One of the hurdles, I understand, was the fact that not everybody in the Association was board certified, so a new type of membership had to be created for the uncertified.*

Maumenee: You're right. One of the rules of the Academy was that you had to be board-certified before you could get in.

Hughes: *Once that merger occurred it was calm and happy?*

Maumenee: Yes. The Academy has a lobbyist. With the government coming into medicine now, it has worked out quite well [for the Academy to have a political stance].

Hughes: *You were on the council in 1963, for a four-year term in 1964, and for another four years in 1970.*

Maumenee: The council nominates the president, vice-president, and other officers. The president and vice-presidents are really figureheads. The executive secretary and the secretaries of the various teaching courses really ran the Academy. Dave Noonan, Bruce Spivey's assistant, really does a tremendous job of running things.

Hughes: *How do you feel about the Academy's move into the political arena?*

Maumenee: I think it really has turned out to be necessary. As I mentioned to you, if I didn't think of something myself, I always thought it was bad. I didn't think of this. I was so determined that the Academy should be a teaching body and not get involved in politics. As things have developed, it's very lucky that we have this. I think it has given the average ophthalmologist what he wants. I don't think the Academy would be anywhere near the size or importance it is if it hadn't gone into politics. So I think it turns out to be a very important step. But I must say, I couldn't see it at the time.

President of the American Academy of Ophthalmology, 1971

Hughes: *In 1971 you became president. Do you have anything to say about that year?*

Maumenee: It was just another function of being on the council. You could invite one guest of honor, so I had Norman Ashton. Then I had five or six other people as honored guests. I got around the stipulation of only one guest of honor by calling the others honored guests. I invited Joaquin Barraquer, [Lorenz] Zimmerman, Mike Hogan, and David Cogan, Irving Leopold, and Frank Newell. But you can look in the *Transactions* of that time and see their names. They each presented papers which were so good, Mosby wanted to publish them, and I think they did publish them as a book.* From that time on, the presidents have had more guests of honor.

The convention center in Dallas was built with the Academy's consultation. The architects said, "Look, who knows more about vision than the ophthalmologists? Who knows more about hearing than otolaryngologists?" So they built a convention center according to our stipulations.

I started having the instruction courses given in Spanish for the Latin Americans. The council was reluctant to accept foreigners as members of the Academy because they hadn't passed the American Board of Ophthalmology exams. There were some very important Europeans who wanted to join. I insisted that they allow them to come into the Academy.

Hughes: *Did they?*

Maumenee: Yes. Now the annual meeting is really international, particularly this time.**

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* Maumenee AE, ed. *Contemporary Ophthalmology.* St. Louis: C. V. Mosby, 1972.

** The 1991 annual meeting was co-sponsored by the Academy and the Pan-American Association of Ophthalmology.

The American Board of Ophthalmology

Reorganization

Hughes: *Dr. [Robert N.] Shaffer wrote that the two of you tried to reorganize the American Board of Ophthalmology.* What exactly were you trying to do?*

Maumenee: Bob has written the history of the American Board.** The American Board of Ophthalmology was the first specialty board in medicine. It started in 1916. At first, they gave a written essay examination to candidates. Then it became a multiple-choice exam that could be put in the computer.

I was chairman of the written committee for four or five years. The oral part of the exam was given in a hospital, where candidates examined patients who were brought in and then the examiners quizzed them about what they found. That really was a terrible thing because, in the first place, they frequently were using slit lamps that were different from the ones that they had used before and that didn't work very well. The ophthalmoscopes also didn't work very well. The patients, after being examined by ten different people, would get fidgety and obnoxious about having the bright lights shone into their eyes. It was terrible. So what Bob and I initiated was to stop having actual physical examinations and instead to use pictures of different diseases. We would show them good pictures and then quiz the resident.

The oral has always been a difficult thing because no two ophthalmologists know the same things. There is a lot of disagreement about what is the best thing to do. Some examiners are very good and some are very poor. The poor candidate could get a tough examiner and a bad grade.

Hughes: *The exam wasn't standardized?*

Maumenee: It just wasn't standardized. We [Bob Shaffer and I] wrote out what we expected a candidate to know, and we gave that to the examiner. If he had a candidate who was doing poorly, he

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* Robert N. Shaffer, MD, to A. Edward Maumenee, MD, January 15, 1991, in "A Collection of Letters from a Selection of Friends on the Occasion of the 50th Meeting of the Wilmer Residents Association, April 25, 1991," prepared by Morton F. Goldberg, MD, Baltimore, and David Paton, MD, New York (bound photocopy). The collection is available at the Wilmer Ophthalmological Institute and at the American Academy of Ophthalmology.

** Shaffer, Robert N. *The History of the American Board of Ophthalmology 1916–1991.* Rochester, Minn.: Johnson Printing Co., 1991.

would have to ask the question written out on that page. The answer would also be given to the examiner.

This system of pictures and answers certainly improved the board exam a lot. I understand that they have now improved it still further in that the assistant examiners and the main examiner that is a member of the board quiz the person at one time and then they make up a grade.

Examiner for the Board

Hughes: *Were you a tough examiner?*

Maumenee: The candidates thought I was the toughest person on the board. They were all deathly afraid of me. It was my fault, because if I had a good candidate, I would keep questioning him. I would finally ask him a question to which I knew nobody knew the answer. He would think that that was what I was grading him on. But it wasn't. I was just trying to see whether I should give him an A+ or an A. I never asked the poorer candidates difficult questions. My average grade was right smack in the middle of the range. I graded quite easily, certainly in the middle level, but I did ask fundamental questions. I asked a lot of pathology and basic physiology. I wanted to see how candidates thought. Because of that, they thought that I was tough.

Hughes: *Did you like examining?*

Maumenee: I enjoyed it.

Hughes: *You weren't reluctant to flunk somebody if you felt he deserved it?*

Maumenee: That's right.

American Ophthalmological Society

Hughes: *Please comment on the American Ophthalmological Society.*

Maumenee: The AOS is one of the oldest ophthalmic organizations in the country. It was started in New York by a group of people who were doing some work on the eyes. Many of them were general surgeons, not trained ophthalmologists. There is a

very good book written by Maynard Wheeler on the first hundred years of the AOS.*

In preparing my presidential address, which I never published, I found out that the New York Academy of Medicine has the original handwritten minutes of the first meetings of the AOS. It is very interesting to read them. People would meet at various homes and present an interesting case. Gradually, they weeded out the general surgeons and kept just the ophthalmologists. It gradually grew to 225 members and has been at that level for at least the last twenty-five years.

It has turned out to be more of a social meeting. They certainly try to pick the best ophthalmologists and the most congenial people in the country. They don't always pick out the smartest people. If a person is very smart and he is unethical, or advertises, or he is in any way difficult, he can't get into the AOS. You have to write a thesis which has to be reviewed and accepted before you can become a member. Many people who have written theses never write another paper after they become members of the AOS. I thought it was founded to be the intellectual organization of ophthalmology. It wasn't until I read the minutes that I realized that it really is primarily a social gathering. It is a delightful organization. You can't find nicer people. The papers are pretty good.

All the papers are published in the *Transactions of the American Ophthalmological Society,* which has only about 100 subscribers outside of members and libraries. Therefore, when you give a paper there, it gets buried and never gets quoted.

Hughes: *So people hesitate to give their best papers at the AOS?*

Maumenee: That's right. They give something they have given the essence of at another meeting and expand on it for the AOS.

Hughes: *How do you feel about the emphasis on the social rather than the academic?*

Maumenee: I guess I was critical of it. It took a long time for them to make me president [1985–1986]. That was the last presidency I've had, except for the International Council of Ophthalmology [1982–1990].

* Wheeler M. *The American Ophthalmological Society: The First Hundred Years.* Toronto: University of Toronto Press, 1964.

Hughes: *Do you think because you had spoken out?*

Maumenee: Yes.

Hughes: *I gather from what you have told me about these social overtones that a good thesis isn't enough to ensure membership; a candidate also has to have certain social attributes.*

Maumenee: I don't think they actually take you on your social attributes; they keep you out if you are obnoxious. You get in because you are a leader in your area in ophthalmology, not necessarily an academic leader who has published outstanding papers, but that you have been an outstanding person. The AOS has tennis tournaments and golf tournaments and fishing tournaments and skeet shooting tournaments and bridge tournaments and gives cups and silver awards to the winners.

VIII. REFLECTIONS

Motivation

Hughes: *What has motivated you in your long and diverse professional career? Why have you done all of the things that you have done?*

Maumenee: Sally, I don't know. I really and truly do not know.

I was determined to be equal to the best ophthalmologist in the world. It wasn't with the idea of getting any acclaim. I never politicked for any position, but I worked hard. When an opportunity came for me to do something, I did it. I also hoped to prove some of the old concepts wrong. The same was true with organizations I joined.

In California, I saw that I could change all of ophthalmology out there. It gave me a great sense of confidence and made me known nationally. As one of my friends said, "I never heard you give a paper that you didn't say something original. You never just rehashed the way other people do. You either didn't give a paper or you gave something new."

When I came back to Baltimore in 1955, Dr. Woods said, "Well, you'll be president of these organizations." I said, "But Prof, I'm not interested in politics. All I want to do is work with Jonas Friedenwald, teach, do research, and make the Wilmer Institute the best place I can make it." I guess I was insensitive about failure because it never occurred to me that I could fail. I didn't really aspire to any position. I just wanted to do the best I could. That was all.

Hughes: *You did end up doing much more than just making the Wilmer a great place. Did your goals change?*

Maumenee: Every single presidency I went into, I changed the organization. I looked at the flaws, and I got people to agree with me. I cultivated friends who were, I thought, smart and capable and ethical. I would work with them to change the organizations. So we changed them, and I got the reputation for being a great leader. Just one thing piled up after another.

Hughes: *Your wife described you as a "power broker."* *

Maumenee: I would think of a power broker as somebody who definitely goes out to use people to put himself ahead. I never did that. I never purposely cultivated anybody to get a job or to get something done. I was really much more interested in, and the thing that really excited me was, teaching residents and doing something in the laboratory or in the operating room that was new and innovative. I hated writing. I did so many things that I never wrote up.

I really enjoyed doing innovative things. As someone said, "I came to watch you operate last year, and now you're doing something entirely different." I said, "I never do the same operation twice. I'm always trying to think of some way to do it differently."

Hughes: *I have a quote from Dr. Norton about your advice to him about controlling a board meeting: "You must be the first to speak, to present your solution to the problem at hand. From then on, the discussion revolves around your view of the problem and your solution."* ** *Do you think that is accurate?*

Maumenee: When I began to hold offices in many different organizations, I knew what was going on in a vast field. Other people were only interested in the one organization where they held office. So I had the great advantage of having inside information on multiple organizations at one time. It gave me a great advantage over my colleagues on the councils who really were primarily in practice.

Hughes: *Do you think there was ever resentment?*

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* Interview with Irene H. Maumenee, MD, November 1, 1989.

** Edward W. D. Norton, MD, to A. Edward Maumenee, MD, January 1, 1991. "A Collection of Letters from a Selection of Friends on the Occasion of the 50th Meeting of the Wilmer Residents Association, April 25, 1991."

Maumenee: I'm sure there was. There always is when you accomplish something others don't agree with. I'm sure that I didn't hesitate to argue with people and to tell them I thought they were wrong. So I'm sure I hurt their feelings and that they didn't like it.

Hughes: *What have you enjoyed most in your medical career?*

Maumenee: I guess two things. One is teaching and seeing my residents really learn and accomplish things. It's very gratifying. It's like having another family and having very successful children and having them be very appreciative. The other thing is I've always really enjoyed doing research and having a new idea and arguing with people and finding out I was right and they were wrong.

I guess the final thing is the care of patients. When the patients come in and say, "You're a god. It's unbelievable. I was blind and now I can see perfectly. I have no problems. You're just the greatest thing that ever lived." It can't help but go to your head a little. [laughter]

Qualities of a Good Physician

Hughes: *What do you think makes a good physician?*

Maumenee: I think he really has to treat the patient as a human being and do the best he possibly can to make that patient a real individual. If he does the best he possibly can for the patient, then he is going to be a good physician. Of course, he's got to have ability. There are some people who would rather go camping or on a cruise instead of studying and working. They can be big socialites, and their patients get terrible treatment because they don't really know what they are doing, and they are not good physicians. I think good physicians have got to be intelligent. I think they have got to work hard. They have got to devote their lives to the patient.

As Duke-Elder used to say, "Your first love is ophthalmology." You've got to love it and love working with it. You are married to ophthalmology if you are a good ophthalmologist.

Leisure Activities

Hughes: *What do you do for relaxation and leisure?*

Maumenee: I've always liked golf and tennis and fishing and hunting—physical activities. I am not an avid reader, outside of ophthalmology. Actually, I think it goes back to my younger years. I figured that if I had any time to read, I should read ophthalmology, so that I would know more about it. Reading novels was a waste of time when I could have been reading ophthalmology. So I am very narrow, from a cultural point of view. There are some people who know all about history, art, music, and things of that sort. I would much rather read a book about ophthalmology.

Hughes: *You wanted to talk about the Trans-Pacific Yacht Race.*

Maumenee: I've had a lot of good times and unusual times. The race was one of them. Carl Jensen, who is an ophthalmologist, asked me if I wanted to be in the Trans-Pac Race with him on his boat.

It was a very exciting thing to sail past Catalina [Island on the Southern California Coast] and never see another boat or another thing except the stars and an occasional airplane flying over, which we had radio contact with. We came in fifth, or something like that, out of thirty-five boats.

Hughes: *Had you had any previous experience with racing?*

Maumenee: I had done a lot of sailing on Mobile Bay [Alabama] but in small boats. Carl had a crew of eleven. I had the twelve to four watch with Boo Pascal and Carl's cousin, who was a urologist.

It was really fun. We were going full sail in a storm with the spinnaker up, and the boom came up, hit the spinnaker, and tore a big hole in it. We thought that was going to ruin us for the race. But I had a thousand yards of dental floss, and I sewed up the spinnaker with dental floss with a lock stitch. [laughter] It held full wind, and we went across the finish line with the spinnaker wide open. I used to carry a picture of us crossing the finish line.

Regrets

Hughes: *Do you have any regrets?*

Maumenee: I'm getting old.

Hughes: *So are we all. [laughter]*

Maumenee: I regretted coming back to Baltimore.

Hughes: *Why?*

Maumenee: Because I was having a great time in California. I had everything going my way.

Hughes: *Can you think of anything that you would have done differently if you had it to do all over again?*

Maumenee: Sally, I never planned anything. You should do the best you can and make every day count and do your hardest work and drive in the right direction.

I guess the one thing that really disappointed me was Spectra. I really got what I thought was very unfair criticism. I think there are people who still consider Spectra a black mark on my career. But to me it wasn't. I thought this was a great opportunity to have something to do when I retired, to help out patients, and to develop innovative products. I got involved in something that's caused me more of a headache than anything I've ever done.

Greatest Contribution

Hughes: *What do you consider to be your greatest contribution?*

Maumenee: I guess my greatest contribution is general leadership in ophthalmology. I have been told by people all over the world, "You're the leading ophthalmologist in the world. You're the most outstanding." I was told last night by the Russians that I've been the rock that has held them interested in joining up with the West. People from all countries on the International Council said, "You're the only person who has the personality and the drive and the ideas to make things go. We want you to stay on as honorary life president." Patients come in all the time and tell me that they saw such and such a doctor and

he said, "Dr. Maumenee? You've seen him? He's tops in ophthalmology. He really leads us all."

I think that has made me feel quite good. Certainly contributing to that feeling has been the fact that my residents have done so well. I have had the good luck of choosing good people and having them work out right.

Being the leading ophthalmologist, there is hardly a place that I've ever been that people didn't know me or what I had written. They have always given me the best position in anything that comes along. I've always been treated as kind of a king wherever I've gone, which is very nice.

A. Edward Maumenee and
Sue Ballard Maumenee, 1993

APPENDICES

CURRICULUM VITAE

Name	Alfred Edward Maumenee, MD
Date of Birth	September 19, 1913
Place of Birth	Mobile, Alabama
	Married, Anne Elizabeth Gunnis, July 1949
	Children: Anne Elizabeth, born 1950 Alfred Edward III, born 1951
	Married, Irene Hussels, October 1972
	Children: Niels Kim, born 1973 Nicholas Radcliff, born 1975
	Married, Sue Ballard, August 1993

Education	**Degree**	**Year**
University of Alabama,	AB	1934
University of Alabama, Medical School		1936
Cornell University School of Medicine	MD	1938
Wilmer Ophthalmological Institute, The Johns Hopkins Hospital:		
Assistant Resident in Ophthalmology		1939–42;
Chief Resident in Ophthalmology		1942–43

Honorary Degrees

F.R.C.S.ED., Honorary Fellow of the Royal College of Surgeons of Edinburgh, 1971.

Sc.D., Honorary Doctor of Sciences, University of Illinois, 1974.

Sc.D., Honorary Doctor of Sciences, University of Alabama, 1982.

M.D., Honorary Doctor of Medicine, Technischen Universitat Munchen, 1986.

Academic Appointments

Director Emeritus, Department of Ophthalmology, Wilmer Ophthalmological Institute, The Johns Hopkins University School of Medicine, July 1979–.

Director, Department of Ophthalmology, Wilmer Ophthalmological Institute, The Johns Hopkins University School of Medicine, July 1955–June 1979.

William Holland Wilmer Professor Emeritus of Ophthalmology, The Johns Hopkins University School of Medicine, July 1979.

William Holland Wilmer Professor of Ophthalmology, The Johns Hopkins University School of Medicine, July 1955–June 1979.

Chairman, Division of Ophthalmology, Stanford University Hospital, 1948–55.

Professor of Surgery in Ophthalmology, Stanford University, 1948–55.

Associate Professor of Ophthalmology, The Johns Hopkins University School of Medicine, 1946–48.

Assistant Professor of Ophthalmology, The Johns Hopkins University School of Medicine, 1943–46. (On military leave, 1944–46.)

Instructor in Ophthalmology, The Johns Hopkins University School of Medicine, 1942–43.

Military Service

Lieutenant, U.S. Navy (Marine Corps), 1944–46.

Hospital Appointments

Ophthalmologist-in-Chief Emeritus, The Johns Hopkins Hospital, July 1979–.

Ophthalmologist-in-Chief, The Johns Hopkins Hospital, July 1955–June 1979.

Trustee, The Johns Hopkins Hospital.

Chairman, Medical Board, The Johns Hopkins Hospital.

Chairman, Division of Ophthalmology, Stanford University Hospital, 1948–55.

Consultant in Ophthalmology, San Francisco Hospital, 1948–55.

Consultant in Ophthalmology, Laguna Honda Hospital, 1948–55.

Civilian Consultant, Letterman Army Hospital, 1948–55.

Civilian Consultant, U.S. Naval Hospital, Oakland, Calif., 1948–55.

Civilian Consultant, Walter Reed Army Hospital, 1955–78.

Civilian Consultant, U.S. Naval Hospital, Bethesda, Md., 1955–78.

Civilian Consultant, Clinical Center, National Institutes of Health, 1955–.

Civilian Consultant to Surgeon-General, U.S. Navy, Special Consultant on Matters of Education in the Field of Ophthalmology, 1963–.

Consultant, Baltimore City Hospitals, 1959–.

Consultant, U.S. Public Health Service Hospital, Wyman Park, 1965–.

Consultant, National Academy of Sciences, 1974.

Associate Ophthalmologist, The Johns Hopkins Hospital, 1946–48.

Clinical Staff, Mt. Zion Hospital, San Francisco, Calif., 1949–55.

Clinical Staff, Children's Hospital, San Francisco, Calif., 1949–55.

Positions Held

Director

Director Emeritus, Department of Ophthalmology, Wilmer Ophthalmological Institute, The Johns Hopkins University School of Medicine, July 1979–.

Director, Department of Ophthalmology, Wilmer Ophthalmological Institute, The Johns Hopkins University School of Medicine, July 1955–June 1979.

Director, Ophthalmic Publishing Co., 1968–.

Honorary Director, Instituto de Ciencias de la Visión del Comité Nacional Prociegos y Sordomudos, Guatemala, 1982.

Ophthalmologist-in-Chief

Ophthalmologist-in-Chief Emeritus, The Johns Hopkins Hospital, July 1979–.

Ophthalmologist-in-Chief, The Johns Hopkins Hospital, July 1955–June 1979.

Chair in Ophthalmology

The William Holland Wilmer Chair in Ophthalmology, The Johns Hopkins University School of Medicine, July 1955–June 1979.
July 1979– (Emeritus).

Trustee

Trustee, The Johns Hopkins Hospital.

Trustee, Association for Research in Ophthalmology, Inc., 1963–68.

Trustee, Association of University Professors of Ophthalmology, 1963–68.

Trustee, The Ophthalmic Publishing Company, 1967.

President

Honorary Life President, Concilium Ophthalmologicum Universale (International Council of Ophthalmology), 1990. This honor has only been bestowed on two other persons: Sir Stewart Duke-Elder and Professor Jules François. President, 1982–90.

President, American Ophthalmological Society, 1985.

First President, Association of University Professors of Ophthalmology, 1965–66.

President, American Academy of Ophthalmology and Otolaryngology, 1971.

Acting President, International Agency for Prevention of Blindness (formerly International Association for Prevention of Blindness), 1968–70.

President, Pan-American Association of Ophthalmology and Otolaryngology, 1972–75.

President, Board of Directors, *American Journal of Ophthalmology,* 1975–1989.

President, International Congress on Cataract Surgery, First, 1978; Second, 1981; Third, 1984; Florence, Italy.

President, 24th International Congress of Ophthalmology, San Francisco, 1982.

President, Science Advisory Committee, International Eye Bank, Baltimore, Md.

President, The Ophthalmic Publishing Company, 1982–89.

Chairman

Chairman, Medical Board, The Johns Hopkins Hospital.

Chairman, Division of Ophthalmology, Stanford University, 1948–55.

Chairman, of Trustees, Association for Research in Ophthalmology, Inc., 1968.

Chairman, National Committee, 24th International Congress of Ophthalmology, 1982.

Chairman, American Board of Ophthalmology, 1967. Vice-Chairman, 1966.

Chairman, AMA Section on Ophthalmology, 1965.

Chairman, Association of University Professors of Ophthalmology, 1965–66.

Chairman, Planning Subcommittee, National Institutes of Health, 1977.

Chairman, Advisory Committee of International Relations, National Society for the Prevention of Blindness.

Chairman, Advisory Committee, Ophthalmic Drugs Council, U.S. Public Health Service, Food and Drug Administration, 1970–73.

Chairman, Board of Directors, Pan-American Ophthalmological Foundation, 1974–.

Chairman, Symposium on Connective Tissue Diseases, Cambridge, England, September 13–14, 1974.

Chairman, Advisory Committee, Variety Club Blind Babies Foundation, 1949–55.

Chairman, Scientific and Technical Advisory Committee, Mentor O & O, Inc., 1985–.

Chairman of the Board, Chief Executive Officer, and Director, Spectra Pharmaceutical Services, Inc., 1985.

Honorary Chairman, Board of Trustees, Pakistan Eye Foundation, Rockville, Md., 1990–.

Vice-President

Vice-President, Concilium Ophthalmologicum Universale (International Council of Ophthalmology), 1977.

Vice-President, American Ophthalmological Society, 1985–85.

Vice-President, American Academy of Ophthalmology and Otolaryngology, 1962.

First Vice-President, International Association for Prevention of Blindness, 1966–68.

Vice-President, International Agency for Prevention of Blindness, 1970–74.

Vice-President, Pan-American Ophthalmological Foundation, 1966–67.

Vice-President, The Ophthalmic Publishing Company, 1973.

Associate Officer

Order of St. John, 1972.

Board of Directors

American Journal of Ophthalmology, President, Board of Directors, 1975.

National Society for the Prevention of Blindness, Member, Board of Directors, 1978.

Pan-American Ophthalmological Foundation, Board of Directors: Chairman, 1974–; Member, 1967–.

The Ophthalmic Publishing Company, Member, Board of Directors, 1968–89.

Mentor O & O, Inc., Member, Board of Directors, 1985–.

Advisory Board

The Johns Hopkins Hospital, Member, Advisory Board, 1955–.

Society of Eye Surgeons, Member, Advisory Board, 1970–.

International Eye Bank, Member, Advisory Board, 1965–.

Audio Digest Ophthalmology, Member, Editorial Advisory Board, 1963.

Institute for Sensory and Brain Research, Member, Advisory Board, 1970–.

Saudi Eye Foundation for Research & Prevention of Blindness, Member, Advisory Board, 1989–.

California Bureau of Vocational Rehabilitation, Member, Medical Advisory Board, 1949–55.

Advisory Committee

American Foundation for Overseas Blind, Member, Advisory Committee, 1972–74.

Asia-Pacific Academy of Ophthalmology, Member, Advisory Committee, 1976.

California Department of Public Health, Member, Advisory Committee of Ophthalmologists, 1949–55.

California Department of Social Welfare, Member, Advisory Committee of Ophthalmologists, 1950–55.

International Eye Bank, President, Scientific Advisory Committee.

Knights Templar Eye Foundation, Ophthalmologist-Advisor, 1956.

National Academy of Sciences, Member, Advisory Committee (Ophthalmology), 1955–58.

National Council to Combat Blindness, Member, Scientific Committee, 1950–.

National Society for the Prevention of Blindness, Member, Advisory Committee, 1955–.

National Society for the Prevention of Blindness, California Chapter, Member, Professional Advisory Committee, 1948–55.

New York Eye and Ear Infirmary, Member, Advisory Committee, 1956–58.

Ophthalmic Foundation, Member, Advisory Committee, 1956–62.

The Seeing Eye, Inc., Member, Advisory Committee, 1967–70.

Mentor O & O, Inc., Chairman, Scientific & Technical Advisory Committee, 1985–.

Advisory Council

American Academy of Ophthalmology & Otolaryngology: Member of Council, 1963, 1964–68, 1970–; Councillor, 1964–68.

American Ophthalmological Society, Member of Council, 1975–.

National Eye Institute, Member, National Advisory Eye Council, 1969–71; 1975–.

National Institutes of Health, NIH National Advisory Eye Council, Chairman, Planning Subcommittee, 1977.

Neurological Diseases and Blindness, Member, Advisory Council, Subcommittee on Impaired Vision and Blindness, 1967–69.

The Alfred P. Sloan Foundation, Member, Advisory Council for Research in Glaucoma and Allied Diseases, 1956–68.

American Federation for Aging Research (AFAR), Inc., Member, National Scientific Advisory Council, 1985–.

Advisory Panel

Research to Prevent Blindness, Member, Scientific Advisory Panel, 1962.

World Health Organization: Member, WHO Expert Advisory Panel on Trachoma and Prevention of Blindness, 1979–84, 1984–; Member, Programme Advisory Group for the Prevention of Blindness in the WHO Program, 1978–; Member, WHO Scientific Advisory Panel, Onchocerciasis Control Program, 1974–.

Consultant

International Agency for Prevention of Blindness, (formerly International Association for Prevention of Blindness), Honorary Consultant to Annals, 1979–.

John F. Kennedy Institute, Consultant, Medical Staff, 1973–74.

National Institute of Neurological Diseases and Stroke, U.S. Public Health Service. Consultant, National Institute of Health Graduate Training Committee, 1953–55.

Vanderbilt University, Department of Ophthalmology, Consultant to the Vice-Chancellor, 1975.

World Health Organization, Consultant, Onchocerciasis Project, 1974–.

Visiting Professor

George Washington University, 1968.

Guys Hospital, London, 1958.

Harvard College, Paul A. Chandler Visiting Professor of Ophthalmology, July 15–31, 1971.

Henry Ford Hospital, Detroit, 1964.

Massachusetts Eye & Ear Infirmary, Harvard Medical School, 1971.

San Diego Academy of Ophthalmology, February 4, 1980.

Stanford University, Allergan Visiting Professor of Ophthalmology, September 21–22, 1987.

Tulane University of Louisiana, 1973.

La Universidad de Cartagena, Cartagena, Colombia, April 26, 1982.

University of Arizona, 1974.

University of California, San Francisco, 1962.

University of Cincinnati, 1963; 1977.

University of Gainesville, Gainesville, Fla., January 10–12, 1980.

University of Honolulu, 1966.

University of Illinois, Chicago, 1971; 1974.

University of Kentucky, March 1–2, 1976.

University of Miami, Miami, Fla., 1966.

University of Miami, Bascom Palmer Eye Institute, 1974.

University of Pittsburgh, January 13, 1977.

University of Puerto Rico, San Juan, Puerto Rico, 1971.

Washington University, St. Louis, Mo., 1968.

Yale University, 1971.

Awards

Society of Military Ophthalmologists Award, 1959.

Beverly Myers Achievement Award, 1967. Educational Foundation on Ophthalmic Optics.

The Howe Medal, 1969. American Ophthalmological Society.

The Lucian Howe Gold Medal, 1970. A.M.A. Section on Ophthalmology.

The Howe Medal, 1970. Buffalo Ophthalmological Society.

The Francis I. Proctor Research Medal, 1972. The Association for Research in Vision and Ophthalmology.

The Jorge Malbran Gold Medal, 1974, Argentina.

Physician's Recognition Award. American Medical Association, 1973–1976.

First John M. McLean Gold Medal Award, 1976. The International Eye Foundation Society of Eye Surgeons.

The $25,000 Research to Prevent Blindness Trustees' Award, 1976.

The 1977 Alumnae Award of Distinction. Cornell University Medical School.

Distinguished Public Service Award, 1977. Department of the Navy, Washington, D.C.

The Knights Templar Eye Foundation Award of Appreciation, 1977.

Gradle Medal for Teaching, 1979. Pan-American Association of Ophthalmology.

Krieger Prize on Ophthalmology, 1979. Sinai Hospital of Baltimore, Division of Ophthalmology.

Castroviejo Medal for 1980.

Award of Merit. City of Baltimore Mayor's Citation to Edward Maumenee, 1980.

Distinguished Service Award, 1981. Asia-Pacific Academy of Ophthalmology.

The Most Distinguished Alumnus Award, 1981. The University of Alabama in Birmingham.

The First Maumenee Gold Award, 1981.

The Leslie Dana Gold Medal Award, 1981. The St. Louis Society for the Blind.

Frank Claffy Memorial Medal, 1982. University of Sydney, Australia.

The Gonin Medal (Medaille Gonin), 1982. Université de Lausanne, Société Suisse d'Ophtalmologie.

First Knights Templar National Public Service Award, 1982.

Schlaegel-O'Connor Medal for Uveitis, 1984.

La Orden Rodolfo Robles (The Rodolfo Robles Order), 1984. Ministerio de Salud Pública y Asistencia Social, Guatemala.

Ophthalmic Award of Excellence, 1984. Vanderbilt Medical Center & Hospital Corporation of America.

The 1985 Pisart Vision Award. The Lighthouse, the New York Association for the Blind.

The International Duke-Elder Medal, 1986. International Council of Ophthalmology.

Medalla de Oro y Premio Instituto Barraquer (Gold Medal and Award, Barraquer Institute), 1987. Barcelona, Spain.

The Paul Harris Fellowship Award, 1987. The Rotary Club, Baltimore.

The First Bennedetto Strampelli Medal, 1988. The International Mediterranean Ophthalmological Society, Rome, Italy.

Saudi Arabian Ophthalmological Society Medal, 1988.

George L. Tabor, MD Award, 1988. San Diego Eye Bank.

L. Harrell Pierce, MD, Wilmer Resident Teaching Award, 1989.

The Dr. P. Siva Reddy International Gold Medal, 1989. Hyderabad Academy of Ophthalmology, India.

First Gold Medal of the Societá Oftalmologica Internazionale del Mediterraneo, 1989, Palermo, Italy.

The Jose Rizal Gold Medal, 1990. Asia-Pacific Academy of Ophthalmology.

Award recognition for establishment of the National Eye Institute, Alliance for Eye and Vision Research, 1993.

Other Honors

Plaque, Society of Military Ophthalmologists, 1959.

Certificate, Sociedad Argentina de Oftalmología, Buenos Aires, 1968.

Plaque, Association of University Professors of Ophthalmology, 1965–69.

Plaque, Association for Research in Ophthalmology, Inc., 1969.

Diploma, VII Congreso Panamericano de Oftalmología, Bogota, 1971.

First Silver Membership Plaque, for launching Fund-Raising Campaign, March 8, 1971. Presented at the White House by President Richard M. Nixon on behalf of Research to Prevent Blindness.

Certificate, American Academy of Ophthalmology and Otolaryngology, 1971.

Diploma, Sociedad Venezolana de Oftalmología, Caracas, 1973.

Commissioned a Kentucky Colonel by Julian M. Carroll, Governor, Commonwealth of Kentucky, 1976.

Honored at Banquet of the Centennial Congress on Retinal and Choroidal Diseases, Johns Hopkins Medical Institutions, 1976.

Certificate, The American Board of Ophthalmology, 1976.

Certificate of Acceptance. Iolab Corporation. Investigative Device Exemption Investigator for Iolab Corporation, 1978.

Certificate, American Academy of Ophthalmology and Otolaryngology, 1977.

Festschrift issue of the *American Journal of Ophthalmology* to honor A. E. Maumenee, MD. (*AJO* 1979 Sept;88 [3 Pt 1].)

Plaque, Patient's Recognition, Associated Jewish Charities and Welfare Fund, Baltimore, 1980.

Honored Speaker, Eighth Annual Program, San Diego Eye Bank, 1988.

Honorary Fellow, The Australian College of Ophthalmologists, Sydney, 1988.

Plaque, for support of development and education programs of Division of Ophthalmology, Howard University College of Medicine, Washington, D.C., 1965–1990.

The Thirty-Ninth Science Meeting in Honor of A. E. Maumenee, MD. The Residents Association of the Wilmer Ophthalmological Institute, 1980.

Volume Dedicated to A. Edward Maumenee, MD. *Current Concepts in Cataract Surgery*. Selected Proceedings of the Sixth Biennial Cataract Surgical Congress. Edited by Jared M. Emery, Adrienne C. Jacobson. St. Louis: Mosby, 1980.

Plaque. Honorary director, Instituto de Ciencias de la Visión, Guatemala, 1982.

Plaque. Patient's recognition from Florence May Eichberg, 1982.

Plaque. Research to Prevent Blindness, 1983.

The A. Edward Maumenee Building. Third building of The Wilmer Ophthalmological Institute. Dedication, November 8, 1982; inauguration, April 19, 1983.

Diploma. XIV Congreso Panamericano de Oftalmología. Lima, Peru, 1983.

Certificate of charter membership. International Glaucoma Congress.

Diploma and Recordatory Medal. Accademia Medica di Roma, Italy, 1987.

Memberships

Academia Ophthalmologica Internationalis. Charter Member No. XL. Bal Harbour, Florida, 1975.

Accademia Medica di Roma, Foreign Honorary Member, 1987.

Accademia Ophthalmologica Italica, Honorary Member, Florence, Italy, 1981.

Alpha Omega Alpha, National Medical Honor Society, Johns Hopkins Chapter. Honorary Member, 1976.

American Academy of Ophthalmology and Otolaryngology: President 1971; Vice-President, 1962; Councillor, 1964–68; Member of Council, 1963, 1964–68, and 1970–.

American Association of Ophthalmology, 1972.

American Board Ophthalmology: Chairman, 1967; Vice-Chairman, 1966; Member 1959–67.

American Foundation for Overseas Blind, Member Advisory Committee, 1972–74.

American Medical Association.

A.M.A. Section on Ophthalmology, Chairman, 1965.

American Ophthalmological Society: President, 1985–; Vice-President, 1984–85; Member of Council, 1975–; Member 1958–.

Argentine Ophthalmological Society, Honorary Member, 1968.

Arizona Ophthalmological Society, Honorary Member, 1974.

Association for Research in Vision and Ophthalmology (formerly Association for Research in Ophthalmology, Inc.): Chairman of Trustees, 1968–; Trustee, 1963–68.

Association of University Professors of Ophthalmology: Founding Member, First President, Chairman, 1965–66; Trustee, 1965–69.

Asia-Pacific Academy of Ophthalmology, Member Advisory Committee, 1976–.

California Academy of Sciences and Medicine, Member, 1949–55.

California Bureau of Vocational Rehabilitation, Member Medical Advisory Board, 1949–55.

California Department of Public Health, Member Advisory Committee of Ophthalmologists, 1949–55.

California Department of Social Welfare, Member Advisory Committee of Ophthalmologists, 1950–55.

California Medical Association, 1948–55.

Canadian Implant Association, Member, 1984.

The Castroviejo Society, Member of the Castroviejo Corneal Society, 1982.

Fundación Oftalmología Argentina Jorge Malbran, Member (Comisión Asesora en lo Cientifico), 1979.

Hellenic Ophthalmological Society, Honorary Member, 1969; Advisory Committee of Ophthalmologists, 1949–55.

Institute for Sensory and Brain Research, Member, Advisory Board, 1970–.

Instituto de Ciencias de la Visión del Comité Nacional Prociegos y Sordomudos, Honorary Director, 1982.

International Agency for Prevention of Blindness (formerly International Association for Prevention of Blindness): Acting President, 1968–70; First Vice-President, 1966–68; Vice-President, 1970–74; Honorary Consultant to Annals, 1979–; Member, at large, 1974–.

International Council of Ophthalmology (Concilium Ophthalmologicum Universale): Honorary Life President, 1990; President, 1982–90; Vice-President, 1977; Ex-Officio Member, Gonin Commission 1983; Member, International Study Committee on Teaching and Continuing Education in Ophthalmology, 1974.

International Eye Bank, Member, Advisory Board, 1965–

International Eye Foundation, Member, 1961–.

International Glaucoma Committee (formerly International Glaucoma Club), Honorary Member.

International Glaucoma Congress, Charter Member.

International Ophthalmic Microsurgery Study Group, Member Emeritus, 1979–.

Japanese Ophthalmological Society, Honorary Member, 1978.

John F. Kennedy Institute, Member Consultant Medical Staff, 1973–74.

Jules Gonin Club, Honorary Member, 1982.

Knights Templar Eye Foundation, Ophthalmologist-Advisor, 1956–.

Louisiana-Mississippi Ophthalmological and Otolaryngological Society, Honorary Member, 1965.

Maryland Ophthalmological Society, Member.

Medical and Chirurgical Faculty of the State of Maryland, Member.

Mentor O & O, Inc.: Chairman, Scientific & Technical Advisory Committee, 1985–; Member, Board of Directors, 1985–.

National Academy of Sciences, Member, Advisory Committee (Ophthalmology), 1955–58.

National Council to Combat Blindness, Member, Scientific Committee, 1950–.

National Eye Institute, Member, National Advisory Eye Council, 1969–71; 1975–.

National Institute of Neurological Diseases and Stroke, U.S. Public Health Service. Consultant, National Institute of Health Graduate Training Committee, 1953–55.

National Institutes of Health: Member, Vision Research Training Committee, 1964–67; N.I.H. National Advisory Eye Council, Chairman, Planning Subcommittee, 1977.

National Society for the Prevention of Blindness: Chairman, Advisory Committee on International Relations; Member, Board of Directors; Voting Member, 1978–79; Member, Advisory Committee, 1955–86.

National Society for the Prevention of Blindness: California Chapter, Member, Professional Advisory Committee, 1948–55.

Neurological Diseases and Blindness, Member, Advisory Council, Subcommittee on Impaired Vision and Blindness, 1967–69.

New York Eye and Ear Infirmary, Member, Advisory Committee, 1956–58.

Ophthalmic Drugs Council, Chairman, Advisory Committee, 1970–73, U.S. Public Health Service, Food and Drug Administration.

Ophthalmic Foundation, Member, Advisory Committee, 1956–62.

Ophthalmic Pathology Club (Verhoeff Society) Member.

Ophthalmic Publishing Company: Vice-President, 1973–; Trustee, 1967–; Member, Board of Directors, 1968–.

Order of St. John, Associate Officer, 1972.

Pacific Coast Oto-Ophthalmological Society, Honorary Member, 1958; Round Table, 1948–55.

Pan-American Association of Ophthalmology, President, 1972–75.

Pan-American Ophthalmological Foundation; Chairman, Board of Directors, 1974–; Vice-President, 1966–67; Member, Board of Directors, 1967–.

Phi Beta Kappa, Member, by action of the Alpha of Maryland at Johns Hopkins University, 1971.

Puget Sound Academy of Ophthalmology and Otolaryngology, University of Tacoma, Washington, Honorary Fellow, 1952.

Research to Prevent Blindness, Member, Scientific Advisory Panel, 1962.

The Royal Australian College of Ophthalmologists, Honorary Fellow, 1988.

San Francisco County Medical Society, Member, 1948–55.

The Seeing Eye, Inc., Member, Advisory Committee, 1967–70.

The Alfred P. Sloan Foundation, Member, Advisory Council for Research in Glaucoma and Allied Diseases, 1956–68.

Societa Oftalmologica Internazionale del Mediterraneo, honorary president to the first meeting of the society, Palermo, Italy, 1989.

Société Française d'Ophtalmologie, Member.

Society of Eye Surgeons, Member, Advisory Board, 1970–.

South African Ophthalmological Society, Member, 1972.

Spectra Pharmaceutical Services, Inc., Chairman of the Board, Chief Executive Officer, and Director, 1985.

University of Illinois Alumni Association, Life Member, 1974.

Variety Club Blind Babies Foundation, Chairman, Advisory Committee, 1949–55.

Wilmer Residents Association, Wilmer Ophthalmological Institute, Johns Hopkins Hospital, Member, 1939.

World Health Organization, Member, Programme Advisory Group for the Prevention of Blindness in the WHO Program, 1978–.

World Health Organization, Member, WHO Expert Advisory Panel on Trachoma and Prevention of Blindness, 1979–84, 1984–87.

World Health Organization, Member, WHO Scientific Advisory Panel, Onchocerciasis Control Program, 1974–; Consultant, Onchocerciasis Project, 1974–.

World Health Organization, Member, WHO Study Group on the Prevention of Blindness in the WHO Technical Report Series No. 518, Geneva, Nov. 6–10, 1972.

Name Lectures: Published

Reprint No.

94. Maumenee AE. Jules Stein Lecture: Further advances in the study of the macula. *Arch Ophthalmol* 1967; 78:151–65.

99. Maumenee AE. Doyne Memorial Lecture: Fluorescein angiography in the diagnosis and treatment of lesions of the ocular fundus. *Trans Ophthalmol Soc UK* 1968; 88:529–56.

114. Maumenee AE. The 26th Edward Jackson Memorial Lecture: Clinical entities in "uveitis": An approach to the study of intraocular inflammation. *Am J Ophthalmol* 1970; 69:1–27; also in: *Trans Am Acad Ophthalmol Otolaryngol* 1970; 74:473–504.

129. Maumenee AE. The Horacio Ferrer Lecture: Fluorescein in the diagnosis and treatment of macular lesions. *Mod Probl Ophthalmol* 1971; 9:188–207.

185. Maumenee AE. The Pocklington Lecture: Recent advances in corneal transplantation. *Trans Ophthalmol Soc UK* 1976; 96:462–70.

272. Maumenee AE. The Robert N. Shaffer Lecture: Causes of optic nerve damage in glaucoma. *Ophthalmology* 1983; 90:741–52.

Name Lectures: Unpublished

The Charles H. May Memorial Lecture, 1957.

The XXII de Schweinitz Memorial Lecture, 1959.

The Wright Memorial Lecture, 1962.

The Albert C. Snell Memorial Lecture, 1965.

The Sanford R. Gilford Memorial Lecture, 1965.

The Arthur J. Bedell Lecture, 1966.

The E. B. Dunphy Lecture, 1966.

The XXII Annual Austin M. Curtis Memorial Lecture, 1967.

The Gradle Lecture: Complications of Cataract Surgery. Presented by A. E. Maumenee during the VIII Pan-American Congress of Ophthalmology in Mar del Plata, Argentina, March 1968. Unpublished by the author, but reported by: Boyd BF, ed. Complications of cataract surgery. *Highlights Ophthalmol* 11:120–32, 1969.

The Francis I. Proctor Lecture, University of California, San Francisco, 1969.

The John McLean Memorial Lecture, 1971.

The Jules Stein Lecture, 1972.

The Proctor Lecture, Association for Research in Vision and Ophthalmology, 1972.

The First Annual Claude W. Wood Lecture, 1972.

The Cecil O'Brien Lecture, Tulane University, 1973.

The Everett L. Goar Lecture, Houston, 1973.

The Jorge Malbran Lecture, Buenos Aires, 1974.

The Ralph Lloyd Lecture, State University of New York, Downstate Medical Center, 1975.

The John McLean Memorial Lecture. Second World Congress on the Cornea, The International Eye Foundation, Washington, D.C., 1976.

The Seymour R. Roberts Memorial Lecture, 1976.

The First Jack S. Guyton Lecture. Henry Ford Hospital, Detroit, June 24, 1977.

The Sir Benjamin Rycroft Lecture: Corneal graft rejection. Queen Victoria Hospital, Sussex, England, June 29, 1977.

The First Asbury Lecture: Pathogenesis of glaucoma field defects late in the afternoon. University of Cincinnati Medical Center, November 29, 1977.

The Mark Schoenberg Memorial Lecture: Visual field loss in glaucoma. New York Society for Clinical Ophthalmology, December 5, 1977.

The Dean's Lecture: The eye as a test-tube for the study of biological phenomena. The Johns Hopkins University School of Medicine. Lecture series no. III, February 6, 1978.

The Estelle Doheny Lecture: Vasculature of optic disc and its importance in visual field loss in glaucoma. Estelle Doheny Eye Foundation. Los Angeles, February 24, 1977.

The First Claude L. Cowan Memorial Lecture: The pathogenesis of visual field loss and glaucoma. University of Maryland School of Medicine, Department of Ophthalmology, Baltimore, July 30, 1978.

The Krieger Memorial Lecture: Future trends of ophthalmology, Sinai Hospital of Baltimore, Division of Ophthalmology, April 24, 1979.

The Castroviejo Lecture. Given at the Annual Meeting of the Castroviejo Society. American Academy of Ophthalmology Meeting, Chicago, November 7, 1980.

The First Jules François Lecture. Given at San Vincent's Hospital and Medical Center of New York, October 18, 1980.

The First Annual Harvey E. Thorpe Lecture. Pittsburgh Ophthalmology Society, March 27, 1981.

The Gonin Lecture: Visual field loss in glaucoma. Université de Lausanne, March 13, 1982.

The John Milton McLean Memorial Lecture: Current status of penetrating keratoplasty. Cornell University Medical College, Department of Ophthalmology, June 11, 1982.

The Eleventh Annual Bruce Fralick Lecture. The University of Michigan, The W. K. Kellogg Eye Center, April 25, 1983.

The Edmund B. Spaeth Lecture. The Edmund B. Spaeth Clinical Research Foundation. The Union League of Philadelphia, March 21, 1983.

The Fourth Annual Tullos O. Coston Lecture. Dean A. McGee Eye Institute, University of Oklahoma, Oklahoma City, April 9, 1983.

The First Lester Quinn Lecture. The University of Texas, Dallas, 1985.

The First Bennedetto Strampelli Lecture. The International Mediterranean Ophthalmological Society Meeting, Rome, Italy, April 1988.

The Dr. P. Siva Reddy International Gold Medal Oration. Hyderabad Academy of Ophthalmology, India, August 4, 1989.

Addresses

Chairman's Address, A.M.A. Section of Ophthalmology, 115th Annual Convention, Chicago, June 1966.

Centennial Address, University of Sydney, April 1982.

Commencement Address, University of Alabama at Birmingham, June 6, 1982.

Presidential Welcoming Address, 24th International Congress of Ophthalmology, San Francisco, October 31–November 5, 1982.

Opening Address, Third International Congress on Cataract Surgery and Visual Rehabilitation, Florence, Italy, May 9–12, 1984.

Keynote Address: The tear film and its pathology. Eighth Annual Program, Current Concepts in Ophthalmology, San Diego Eye Bank, June 25, 1988.

Editorial Positions

American Journal of Ophthalmology: President, Board of Directors, 1975–89; Member, Editorial Staff, 1955–89; Consulting Editor, 1989–.

A.M.A. *Archives of Ophthalmology:* Associate Editor, 1952–53.

Audio Digest Ophthalmology: Member, Editorial Board, 1980.

Contemporary Ophthalmology: Member, Editorial Board, 1980.

EYESAT: Member, Editorial Board, 1981–.

Highlights of Ophthalmology: Associate Editor, 1954–65.

Investigative Ophthalmology: Member, Editorial Board, 1964–68.

Pakistan Journal of Ophthalmology: Member, Editorial Advisory Board, 1984–.

Transplantation Bulletin: Corresponding Editor, 1953–57.

BIBLIOGRAPHY (Provided by Dr. Maumenee)

1. Maumenee AE. Retinal lesions in lupus eyrthematosus. *Am J Ophthalmol* 23:971–81, 1940.
2. Maumenee AE, Hellman LM, Shettles LB. Factors influencing plasma prothrombin in the newborn infant. IV. The effect of antenatal administration of vitamin K on the incidence of retinal hemorrhage in the newborn. *Bull Johns Hopkins Hosp* 68:158–68, 1941.
3. Maumenee AE, Hayes GS, Hartman TL. Isolation and identification of the causative agent in epidemic keratoconjunctivitis (superficial punctate keratitis) and herpetic keratoconjunctivitis. *Am J Ophthalmol* 28:823–39, 1945.
4. Downs CM, Coriell LL, Pinchot GB, Maumenee AE, Klauber A, Chapman SS, Owen B. Studies on tularemia. I. The comparative susceptibility of various laboratory animals. *J Immunol* 56:217–28, 1947.
5. Maumenee AE, Scholz RO. III. The histopathology of the ocular lesions produced by the sulfur and nitrogen mustards. *Bull Johns Hopkins Hosp* 82:121–47, 1948.
6. Maumenee AE, Kornblueth W. Regeneration of the corneal stromal cells. I. Technique for destruction of corneal corpuscle by application of solidified (frozen) carbon dioxide. *Am J Ophthalmol* 31:699–702, 1948.
7. Maumenee AE, Kornblueth W. Symposium: Corneal transplantation. IV. Physiopathology. *Trans Am Acad Ophthalmol Otolaryngol* 52:331–40, 1948; also in *Am J Ophthalmol* 31:1384–93, 1949.
8. Kornblueth W, Maumenee AE, Crowell JE. Regeneration of nerves in experimental corneal grafts in rabbits. Clinical and histologic study. *Am J Ophthalmol* 32:651–59, 1949.
9. Maumenee AE, Kornblueth W. Regeneration of the corneal stromal cells. II. Review of literature and histologic study. *Am J Ophthalmol* 32:1051–64, 1949.
10. Maumenee AE. Retrobulbar alcohol injections. Relief of ocular pain in eyes with and without vision. *Am J Ophthalmol* 32:1502–08, 1949.
11. Maumenee AE. The influence of donor-recipient sensitization on corneal grafts. *Am J Ophthalmol* 34:142–52, 1951.
12. Winter FC, Maumenee AE. An unusual pigmented tumor of the iris. *Arch Ophthalmol* 46:438–40, 1951.
13. Maumenee AE, Michler RC. Sterility of the operative field after ocular surgery. *Trans Pacific Coast Oto-Ophthalmol Soc* 32:172–79, 1951.
14. Friedenwald JS, Maumenee AE. Peculiar macular lesions with unaccountably good vision. *Arch Ophthalmol* 45:567–70, 1951.
15. Müller H, Maumenee AE. Considération sur la maladie du greffon. *Arch Ophthalmol* (Paris) 11:146–54, 1951.

16. Müller H, Maumenee AE. Eintrübung klarer Hornhauttransplantate durch individualspezifische Sensibilisierung des Empfängers. *Graefes Arch Ophthalmol* 152:1–15, 1951.

17. Maumenee AE. Diseases of the retina. *Arch Ophthalmol* 45:572–604, 1951.

18. Müller H, Maumenee AE. Tierexperimentelle Transplantation von Sklera in die Hornhaut. *Graefes Arch Ophthalmol* 152:521–26, 1952.

19. Friedenwald JS, Wilder HC, Maumenee AE, et al. *Ophthalmic Pathology. An Atlas and Textbook.* Published under joint sponsorship of the American Academy of Ophthalmology and Otolaryngology and the Armed Forces Institute of Pathology. Philadelphia: Saunders, 1952.

20. Wiener M. Maumenee AE, Ireland PE, Sullivan JA, eds. *Progress in Ophthalmology and Otolaryngology. A Quadrennial Review.* Vol 1. New York: Grune & Stratton, 1952.

21. Maumenee AE. Diseases of the retina. *Arch Ophthalmol* 47:643–90, 1952.

22. Bock RH, Maumenee AE. Corneal fluid metabolism. Experiments and observations. *Arch Ophthalmol* 50:282–85, 1953.

23. Maumenee AE. Diseases of the retina. *Arch Ophthalmol* 49:553–86, 675–710, 1953.

24. Maumenee AE. Cornea. *Transplantation Bull* 1:7, 1953.

25. Maumenee AE. Bibliography on corneal transplantation. *Transplantation Bull* 1:107–22, 1954.

26. Maumenee AE. The immune concept: its relation to corneal homotransplantation. *Ann NY Acad Sci* 59:453–61, 1955.

27. Maumenee AE. Bibliography on corneal transplantation. *Transplantation Bull* 2:73, 1955.

28. Maumenee AE. The biological problem. In: Rycroft BW. *Corneal Grafts.* London: Butterworth; 208–15; 1955.

29. Tamler E, Maumenee AE. Lens extraction in the treatment of glaucoma. *Arch Ophthalmol* 54:816–30, 1955.

30. Maumenee AE, Shannon CR. Epithelial invasion of the anterior chamber. *Am J Ophthalmol* 41:929–42, 1956; also in *Trans Pacific Coast Oto-Ophthalmol Soc* 36:107–35, 1956.

31. Maumenee AE. Jonas Stein Friedenwald. *Diabetes* 58:155–56, 1956.

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